Absolent

EN Installation manual

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1 Preface

Absolent filter units are today installed worldwide. Depending on where and av who the installation was performed, there are various solutions on the design of the ductwork and the installation of our filter units.

Quality and responsibility are two of Absolent core values. We feel a great responsibility to help our customers around the world to get the maximum benefit from their filter installation. For us, quality does not only mean to sell the best filter unit for the task. Quality is also to give the customer the function he strives for, and a little bit more.

In an attempt to standardize and highlight the key elements of a good filter installation, we have developed this Installation Manual. It is intended as a reference book to installers and distributors around the world, but can also be used in the training of new employees or installers who have not previously worked with process ventilation. It is important to remember that legislation and standards may differ depending on where in the world the installation is to be made.

A good process ventilation takes care of the contaminated air at its source. In order to know which filter type and how much air is needed, the plant needs to be carefully analyzed before the choice of filter type and filter size is made. How the process ventilation is installed is also of great importance for how well it will work. If the machines are not enclosed in the right way, the liquid trap is not designed correctly or the duct system does not have liquid-tight connections etc., there is a risk to stumble at the finish line. Our goal is that the customer gets exactly the function he pursued and thereby the foundation for a good working environment and air quality.

In a workshop that generates much pollution in the form of gases, particles and heat, both process and general ventilation need to be well designed. Then you have the right preconditions to achieve a good working environment and air quality in industrial premises, at least as good as in an office or in a classroom. If the two systems even can be optimized, huge savings can be generated, both in terms of energy and money.

Lidköping, December 2014

Annika Sedwall
Sales & Marketing Director

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3 General

All the staff involved in the installation shall take notice of the filter unit's user's manual before work commences. This installation manual is to be seen as an extra tool which facilitates and ensures that the installation is made correctly.

The safety regulations are intended to prevent personal injury, damage to equipment and property, as well as malfunctions of the product.

Damage to the filter unit or parts thereof caused by the faulty handling of the buyer or the installer cannot be considered a warranty issue, if the instructions given are not followed. All instructions and safety regulations are considered as part of the product.

A machine plate is located on the side of the filter unit. Please refer to the machine plate data when in contact with Absolent or one of Absolent's distributors.

The user's manual can be found in the document pocket on the side of the filter unit.

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4 Security

4.1 General

All Absolents filter units are designed according to the latest technology and the current safety rules. Nevertheless, if used in an incorrect way, they can constitute a risk of injury to the user or damage to the equipment and other property.
The equipment may only be used when it is in technically flawless condition, and if the work is done with regard to safety and possible risks. Disfunction which could affect safety must be corrected immediately.

Read and understand the filter unit's manual before the installation. All personnel involved in the installation, maintenance and operation of this product should be fully aware of the dangerous situations that may occur.

If unauthorized changes or modifications are made to the equipment or its settings, the manufacturer's warranty ends. The warranty does not apply if spare parts, such as cassettes, fans or the like is replaced with other brands.

4.2 Risks

The unit must not be opened during operation! Wait until all rotating parts have stopped before opening.
Evaluate always *all* risks in *all* situations requiring installation or service work and consult and/or hire qualified personnel.

Please contact Absolent or one of Absolents distributors for further questions and/or support. (www.absolent.com or see chapter 12.3, Helpdesk - Support)

4.2.1 Identified hazards

1. The filter units have a high center of gravity and there is a risk of tipping, be very careful when transporting and lifting. Always check the filter unit's weight and its lifting instructions before lifting the filter unit.
2. Clamping risk when the filter unit's doors are opened and closed.
3. Clamping risk when the filter cassettes are replaced, please be aware that the cassettes are both heavy, dirty and full of oil when it's time for changing.
4. Incorrect connection can result in components being destroyed.
5. During operation, never hold your hands near the fan's rotating parts.
6. Loose clothing near the air inlets and the fan can lead to life-threatening injuries.
7. Use appropriate personal protection equipment for all types of service work, as the filter unit may contain hazardous fluids.
8. Filter cassetts are heavy. Always check the current filter cassette's weight in the user's manual before handling.
9. Keep clean from oil spills to avoid slipping risks.
10. If the sound level at the working area exceeds 75 dB (A), ear protection shall be used.

4.2.2 Identified hazards due to electric energy

1. Risk of short-circuit at the connection of electrical components.
2. Because of dangerous voltage and amperage, all service and installation work has to be made off the power grid.
3. Check that the unit is grounded.
4. All cables shall be checked before operation of the unit in order to detect possible damage that may have happened during installation.
5. Don't connect the filter unit to a machine/application with a risk of explosion.
6. If there is risk of fire in the machine, this must be taken into account and prevented to minimize possible damage.

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4.3 Local regulations

Investigate the local regulations for the company before initiating any kind of installation and/or service.

4.4 Fire

In electric equipment, there is always some risk of fire. It is important to always analyze how big the risk is for each machine.

In installations with fire hazard, it is important to contact a certified company to investigate what kind of fire dampers, detection and extinguishing agents should be used, and how the ducting and dampers should be placed. Read more in Chapter 9.3.4 Fire dampers.

4.4.1 Hot work

If the installations require tools that release sparks and/or heat, it is utterly important to follow the rules and regulations in each country. In Sweden, this type of work is called "hot work". To conduct "hot work" in Sweden, there must always be two people involved: the **authorization manager** (buyer) and the **person who will perform the job.**

If the authorization manager determines that the work to be performed is flammable, he/she shall provide a written authorization to the person who will perform the job and also assess whether there is a need for a fire guard. Everyone involved – the authorization manager, the performer and the fire guard must all have valid certificates for "hot work".

All people involved have a responsibility to prevent fire!

PLEASE NOTE! Find out about the rules and legal regulations in each country!

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5 Arrival of the goods

5.1 Acceptance test

Absolent's filter units are delivered standing or lying on a wooden pallet or lying in a wooden box.

Please note that all standing filter units have a high Center of gravity, so there is a tipping risk.

Some of Absolent's larger filter units, for example A•mist^{80TF}, are delivered in two or more parts and assembled on site.

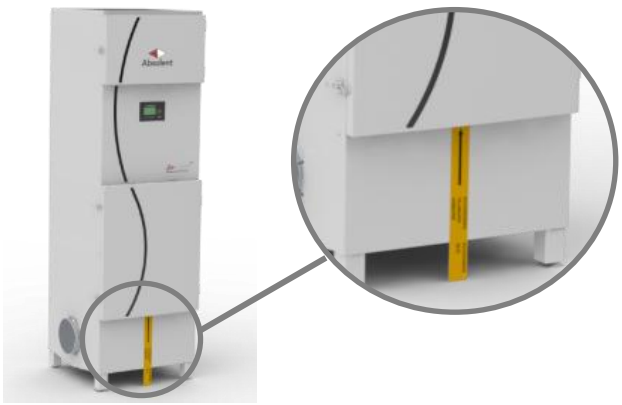
Verify that the number of packages delivered is correct and that they look undamaged. In the event of transport damage, the driver shall record this immediately on the consignment note. If the driver has left the area before the damage is detected, the transport company shall be notified as soon as possible, but latest within 5 days, otherwise the damage will not be replaced.

5.2 Storage

Filter units, components and accessories must be protected from weather and wind, moisture, dust and damage during storage.

Filter units and components must always be stored on an even and secure base. Is the filter unit not installed directly, the packing has to be kept on until installation to avoid damage.

5.3 Non-mounted accessories



Some of the filter unit's accessories are delivered unmounted. These are either packed in an own package or placed inside the filter unit. An orange "tie" shows where the parts can be found.

Please contact Absolent or one of Absolent's distributors for further questions and/or support.

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6 Handling of the filter units

6.1 Transport of the filter unit

Before the Absolent filter unit is lifted off the pallet, please consider if further transportation to the place of installation must be carried out by forklift.

Before/during transport:

- Secure the filter unit properly.
- Make sure that all doors are closed and locked.
- Make sure that the transport pallet is undamaged.
- Make sure that all personnel are at the necessary distance to prevent personal injury.

Please see the filter unit's manual about how each unit should be handled.

6.2 Lifting and rising the filter unit up

Depending on the filter unit's size and how it is delivered, there are different lifting options.

The small filter units can be lifted with lifting eyes or by using straps that are anchored in the device according to the instructions in the respective manual's lifting instructions.

Bild 6.2-1 A.smoke[5]

Bild 6.2-2 A.mist[20] (Lifting eyes are not included as a standard.)

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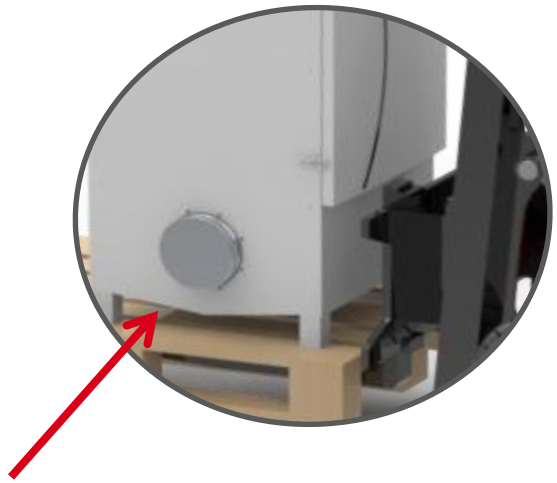
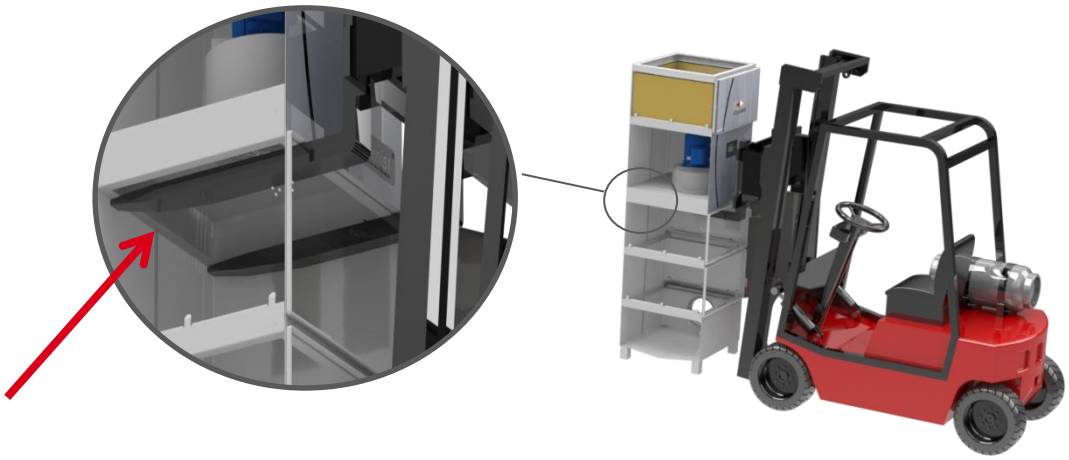
The smaller standing filter units can also be lifted with a forklift. As A.mist[10] and A.mist[20] have a sloped bottom, they can't be lifted from underneath!



PLEASE NOTE! A.mist10 and A.mist20 may not be lifted by forklift from underneath. Those filter units have a sloping bottom!

Remove the filter cassette under the fan section and lift the unit beneath the cross-beams with the help of a forklift. Be very careful so the forks do not harm the back side of the filter unit and make sure that the forks get hold even of the interior beam.



PLEASE NOTE! The filter unit is only to be lifted this way over very short distances.

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For the larger filter units, lifting eyes are used for raising them up from lying to upright position. You can also lift or move the filter unit a short distance by the lifting eyes or with the help of a forklift. If a forklift is used, the filter unit is lifted up from beneath.

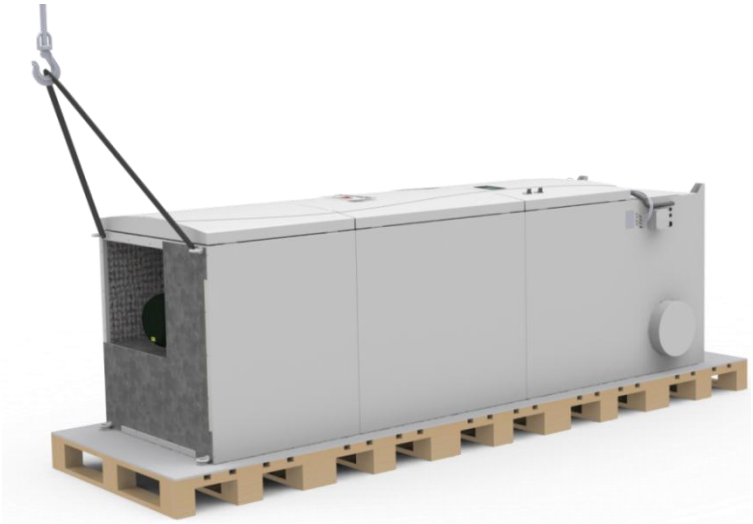

Bild 6.2-3 A.smoke[40]

Bild 6.2-4 A.smoke[40]

PLEASE NOTE! If the filter unit is to be transported a longer distance, always use an undemaged pallet for a safe transport.

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7 Placement

7.1 Placing the filter unit

Absolent offers various mounting options for each filter unit. Common for those is that the floor on which the filter unit is placed must be flat and firm. The floor or base must be designed so that it will support the weight of the filter unit (see the different filter units' user's manuals).

It is also important to allow sufficient open space in front of the service doors of the filter unit so that they can be opened freely and that the interior components such as the filter cassettes can be withdrawn and removed as needed.

7.1.1 Placement on the floor

All filter units can be placed on the floor. The larger filter units are usually placed directly on the floor, while the smaller ones can be enhanced with extension legs, extension frames or floor stands, which are available as an accessory.

Please contact Absolent or one of Absolent's distributors for the accessories available for each filter unit, or check in the filter unit's manual.

Bild 7.1.1-1 A.smoke[5] on floor stand

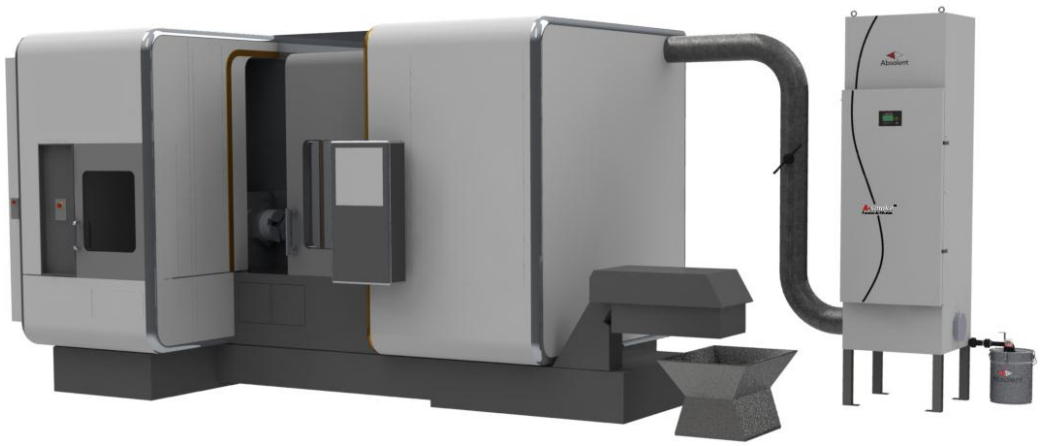

Bild 7.1.1-2 A.smoke[20] with extension legs

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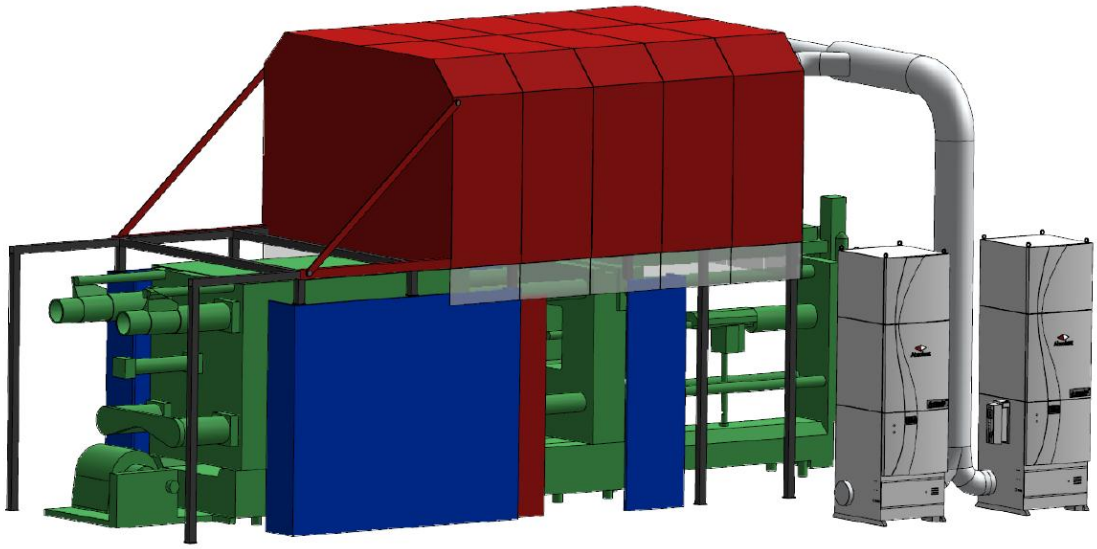

Bild 7.1.1-3: 2 A.smoke[40], installed parallelly

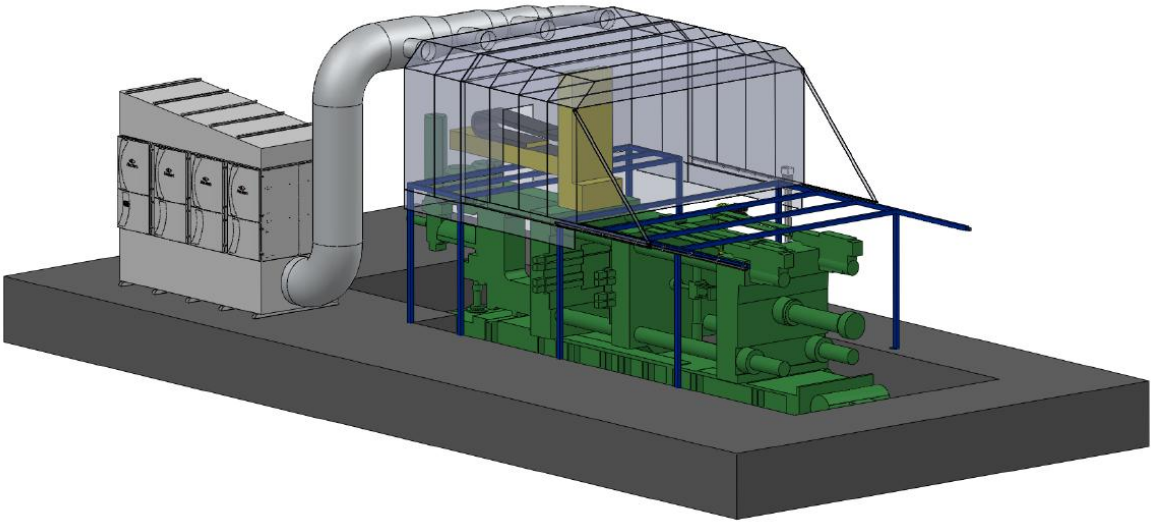

Bild 7.1.1-4 A.smoke[320]

PLEASE NOTE! The design of the floor base determines the appropriate fastening details, which are therefore not included with the unit or accessory.

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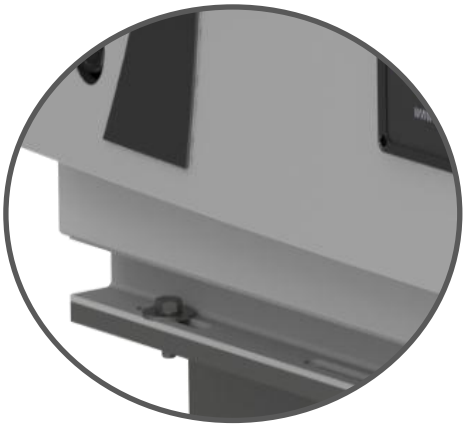
7.1.2 Machine mounted

Absolent's compact filter units can be mounted directly by the machine, either by placing the filter unit on top of the machine or on top of nearby equipment. This not only saves space but also means short ducts which generate a low external pressure drop in the duct system.

Bild 7.1.2-1 A.smoke[5]

Bild 7.1.2-2: A.mist[10C]

Both A.smoke[5] and A.mist[10C] have a slotted rail at the bottom to make the fixation simple and secure. See picture below.



PLEASE NOTE! The design of the base determines the appropriate fastening details, which are therefore not included with the unit or accessory.

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7.1.3 Wall mounted

Absolent's compact units can also be mounted onto the wall or the side of the machine by means of wall brackets, which are available as accessories to the filter units.

Please contact Absolent or one of Absolent's distributors for the accessories available for each filter unit, or check in the filter unit's manual.

Bild 7.1.3-1: A.mist^{10C} on wall brackets

PLEASE NOTE! The wall's construction determines the appropriate mounting detail, which are therefore not included with the unit or accessory.

7.1.4 Hanging up the filter unit

Several of Absolent's filter units can be installed hanging from the ceiling. Fastening is done in different ways depending on the roof construction. One option is 4 threaded rods which are screwed in the lifting details available for each unit. Appropriate fastening details, however, are determined by the roof construction.

Please ensure that the mounting details and roof construction are sized to carry the filter unit. See the user's manuals for the weight of the respective filter unit, including oil-filled filter cassettes.

Bild 7.1.4-1: A.mist^{10C} hung from the ceiling

PLEASE NOTE! Absolent is not responsible for incorrectly executed attachment. The roof construction determines the appropriate mounting details, which are therefore not included in the filter unit or accessory.

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7.1.5 Placement outdoors

Absolent filter units can be placed outdoors, provided that they are protected from the weather.

In countries with cold winters, we do not recommend to place filter units for emulsion applications (water-based cutting fluid) outdoors, as there is a risk that the coolant in the system freezes during the winter.

PLEASE NOTE! Do not place filter units for emulsion applications outdoors in countries with cold winters.

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8 Installation of accessories

8.1 Extension legs/Floor stand

For filter units which are not equipped with a pump, there are extension legs and floor stands available as accessories, to make the drainage function.
Make sure that the filter unit is screwed tightly into the extension legs/floor stand, which in its turn are fastened to the floor.
Please secure the area around the filter unit, so it is protected against being run over by a forklift truck.

Bild 8.1-1 A.mist^{10C} on floor stand

Bild 8.1-2 A.mist^{20} with extension legs

Bild 8.1-3 A.smoke^{5} on floor stand

Bild 8.1-4 A.smoke^{40} on extension frame

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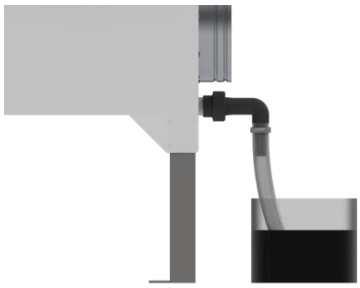
8.2 Return Oil Connection

8.2.1 General

All Absolent's filter cassettes are self-draining, so some sort of connection for the return oil is needed to discharge the liquid drained out of the filter unit. Because of the underpressure that the fan creates in the filter unit, the drainage must be dense to avoid backwash. Either use a closed (sealed) container, liquid trap or a pump in order to prevent this.

PLEASE NOTE! If a hose connection is used without a sealed container/receptacle, it is important that the mouth of the hose is entirely under the surface to prevent backwash and make the liquid trap work.

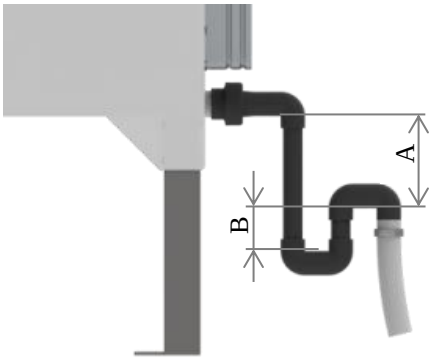


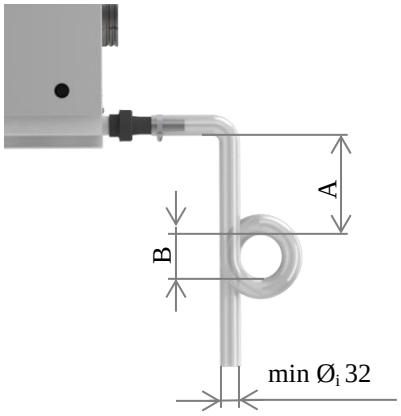
8.2.2 The design of the liquid trap

If you do not buy a complete liquid trap from Absolent, it is important that the liquid trap you use is designed correctly. The relationship between underpressure and height shall be as follows:

Height (A) must be at least as large in millimeters [mm] as the underpressure in the unit in mm wc[*)].

Height (B) must be at least as large in millimeters [mm] as half the underpressure in the unit in mm wc[*)].





The table below shows the heights (A) and (B) for different underpressures.

Underpressure in the unit			Height A		Height B	
[Pa]	[mm vp]	[Inch wc]	[mm]	[Inch]	[mm]	[Inch]
1 500	153	6.02	153	6.02	76,5	3,01
2 000	204	8.03	204	8.03	102	4,02
2 500	255	10.04	255	10.04	127,5	5,02
3 000	306	12.05	306	12.05	153	6,02
3 500	357	14.06	357	14.06	178,5	7,03
4 000	408	16.06	408	16.06	204	8,03
4 500	459	18.07	459	18.07	229,5	9,04
5 000	510	20.08	510	20.08	225	10,04

[*)] mm wc = Millimeter water column; 1 mm wc ≈ 10 Pa

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8.2.3 Selecting return oil connections

Absolent offers several different alternatives for the return oil connection as an accessory. See the filter unit's manual for a more detailed description.

Water Seal, Receptacle

- Transparent receptacle so you can easily see the liquid level.
- Extension legs must be used.
- The connection must be dense.

Water Seal, metal bucket

- Includes a float switch which displays when the receptacle needs to be emptied.
- Extension legs must be used.
- The connection must be dense.
- Can handle higher underpressure than the plastic receptacle.

Water Seal, PVC

- Extension legs must be used.
- The connection must be dense.
- Must be filled with liquid before the filter unit is started.

- ***Water Seal, PVC***
- Extension legs must be used.
- The connection must be dense.
- Must be filled with liquid before the filter unit is started.

PLEASE NOTE! For the use of liquid traps, the filter units usually need to be placed on extension legs or floor stands, which are available as an accessory for the respective device.

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8.3 Pump

8.3.1 General

Filter units that drain out a large quantity of oil from the filter cassettes should have a pump installed. The oil can either be pumped to a central oil purification plant or an oil barrel is positioned in the vicinity of the filter unit. The pump is normally controlled by a level sensor.

All Absolent filter units can be ordered with pump and pump housing (screwed in the case of retrofitting). All A.smoke[40] filter units are prepared for pump and often equipped with a pump from the start.

Please contact Absolent or one of Absolent's distributors to see which pump options are available for each filter unit, or check in the filter unit's manual.

Bild 8.3.1-1 A.smoke[40] with oil barrel

8.3.2 Pump selection

Absolent provides two different brands of pumps, Brinkman and Sacemi. Sacemi is a simple pump with a capacity to transport the oil to a nearby receptacle/oil barrel. The maximum lifting height is 2.5m/8.2ft. The Brinkmann pump has a large capacity that can handle a higher delivery height and therefore can transport the oil to an oil treatment plant, etc.At a delivery height that exceeds 6m/20ft, please control the function of the pump.

BRINKMANN PUMPS

SACEMI

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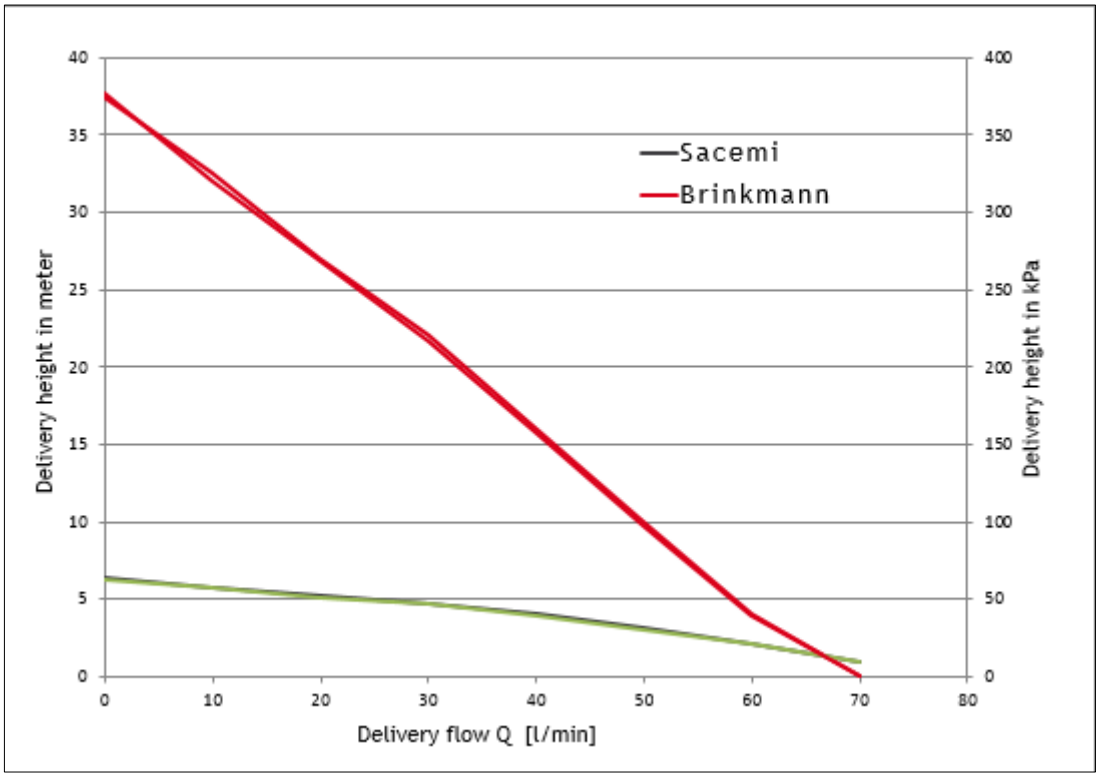
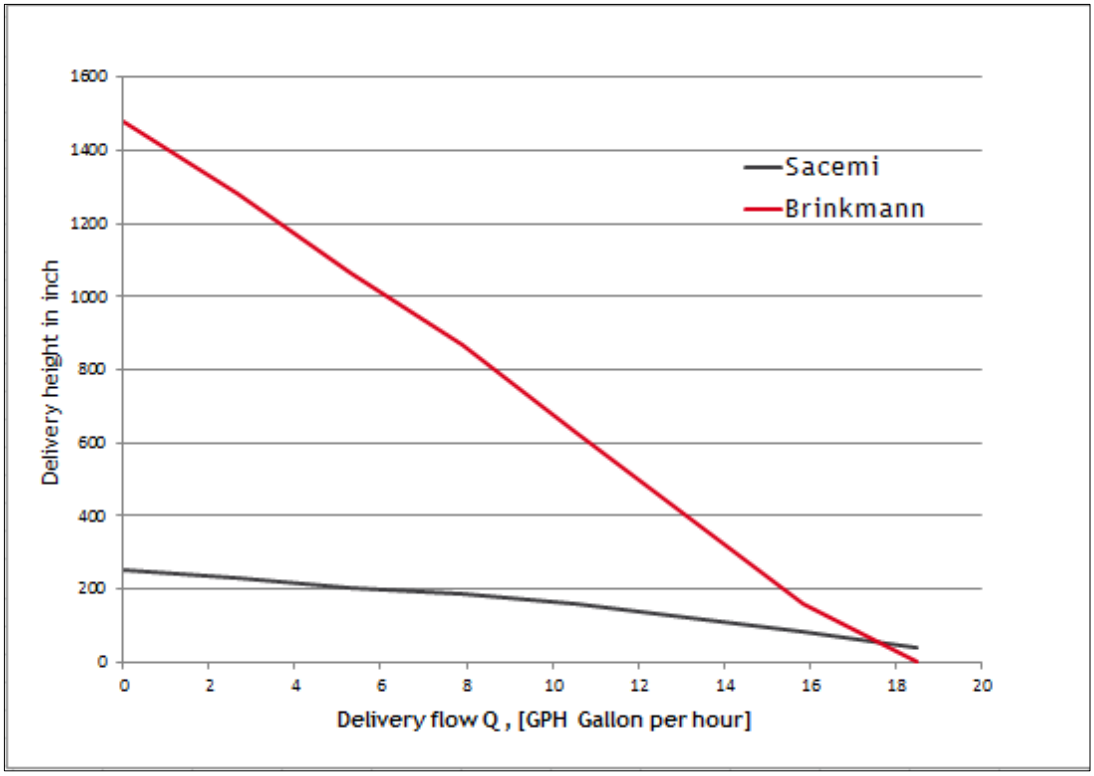
The delivery height in the charts below refers to oil for cutting/machining with a viscosity of approximately 24 mm^2/s. Higher viscosity of the oil reduces the pump's capacity.





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8.3.3 Amount of oil

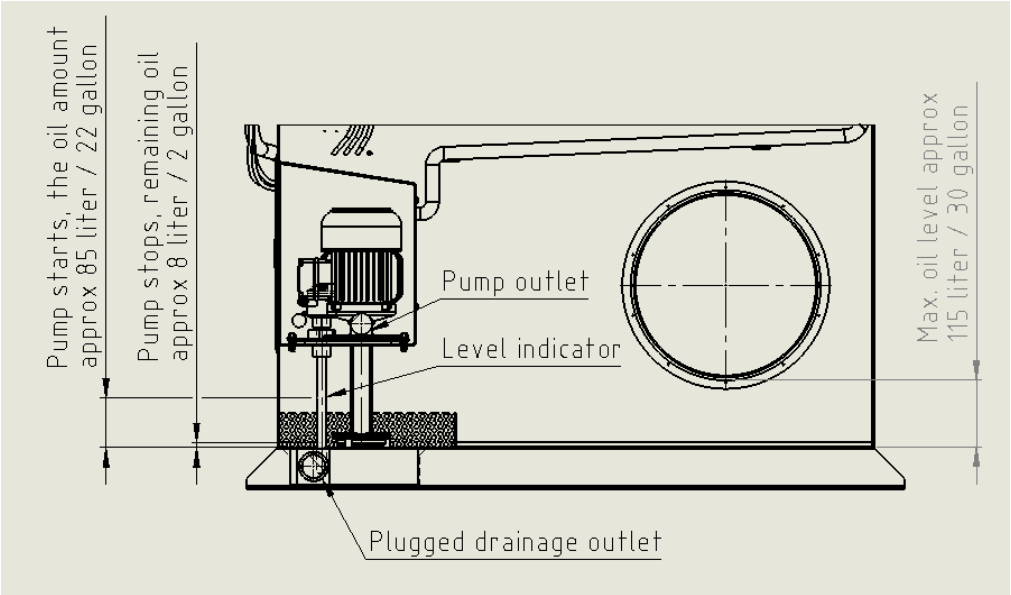
Pump starts, the oil amount approx 85 liter / 22 gallon
Pump stops, remaining oil approx 8 liter / 2 gallon
Pump outlet
Level indicator
Max. oil level approx 115 liter / 30 gallon
Plugged drainage outlet

Bild 8.3.3-1 A.smoke[40] with pump and level sensor. The picture shows at which amounts of oil the pump starts working.

The oil is collected in the bottom of all filter units. If a level sensor is used, the pump starts working when the oil has reached a certain level. Keep in mind that our larger filter units can store a lot of oil before the pump starts to work, so equip the filter unit with a sufficiently large receptacle. An A.smoke[40] is emptied with nearly 85 litres/22 gallons of oil when the pump starts. The corresponding figure for an A.smoke[80] is double the amount, i.e. 170 liters/44 gallons.

The pump is controlled by a level sensor.

PLEASE NOTE! The pump starts when the oil has reached a certain level in the filter unit. Be sure to have a sufficiently large receptacle since it is a large quantity of oil to be evacuated every time the pump starts.

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8.4 Motor protection

8.4.1 General

When an electric motor is connected to a power grid, you need to install some kind of motor protection. For some of Absolent's filter units, a motor protection is included as a standard, while for others, it must be purchased as an accessory. Always check if the starting equipment is included in the delivery from Absolent.
Motor protection protects not only the engine and the network in the event of breakdowns, but also functions as an on-and-off switch, i.e. start and stop.

8.4.2 Cable sizing and fuse

When a filter unit is installed, wired connections, cables and fuses need to be sized correctly in relation to the effect of the fan motor. The preferred size of fuse is indicated in the respective unit's manual.

PLEASE NOTE! Check that the motor starter is set to the correct output/power for each filter unit before the connection is made.

8.4.3 Contactor motor protection

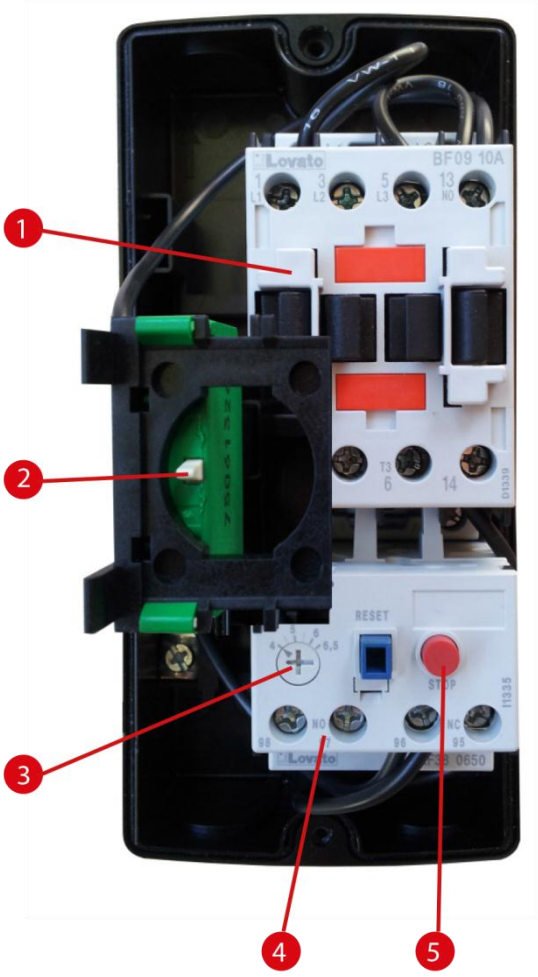
Absolent uses so-called contactor motor protection. This starter includes a contactor that closes or disconnects the voltage. The motor protection closes by an auxiliary switch, contactor. The starter coil is activated manually via a push button (green) or a knob. Contactor motor protection consists also of a motor protection part breaking the voltage at high current or heat.

The motor protection disconnects in several ways:

- Manually with the button (red) or knob.
- Power failure at one or more stages
- Overcurrent
- Heat (high current and low voltage)

8.4.4 Settings

The motor protector has an adjustable limit for when it breaks the voltage, for example 4.0-6,3A (motor protection for A.mist^{20}/2.2 kW). The motor protection must, therefore, be set to the rated current as stated on the filter unit's machine plate. If the motor protection was mounted by Absolent, this setting has been made during the test run.



1. Contactor
2. Starter coil
3. Power setting
4. Motor protection
5. Stop

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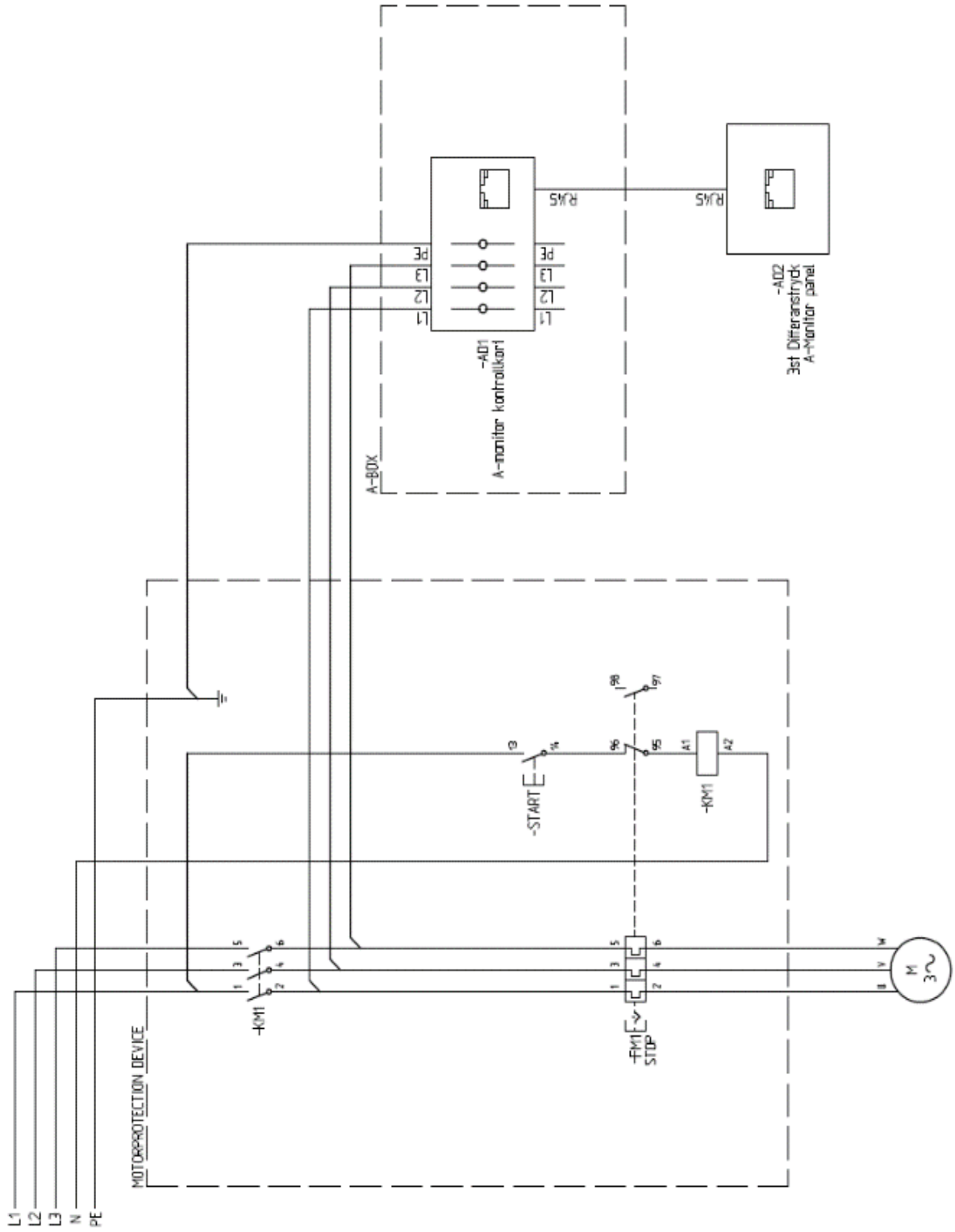
8.4.5 Electric drawing of the motor protector (example including A.monitor)



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9 Duct dimensioning

9.1 Design of the duct system

9.1.1 General

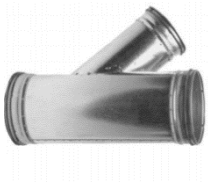
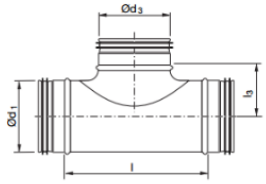
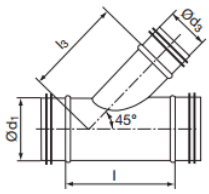
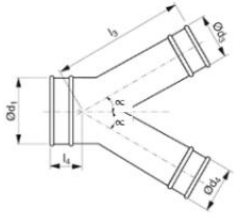
The dirty air sucked out from the machine is transported in the duct system between the machine(s) and the Absolent filter unit. This ducting must be liquid-proof and it is utterly important that all joints and connections are sealed tightly to prevent leakage. The air sucked out from the machine contains a large amount of oil.

PLEASE NOTE! The duct system between the machine and the filter unit must be liquid-proof and all joints must be sealed properly.

If the air isn't supposed to be released back to the working area, a duct connection is installed so that the now clean air is transported outside or into a ventilation unit (with or without heat recovery). This duct system does not need to be liquid-proof because the air is now clean and free from harmful oil particles.

The duct systems after the filter unit, as well as for general ventilation, need only be dimensioned for the minimum pressure drop (thus minimizing the energy consumption), while a duct system intended for process ventilation must be designed both for the best performance and the lowest pressure drop.

The air velocity in a duct system intended for process ventilation must be sufficiently high, so the pollution is not accumulated with leakage as a result. It is also important how the duct system is dimensioned and designed in order to get the best performance and a minimal pressure drop. Avoid "sharp" 90° bends and sharp T-ducts, use duct bends with a 'long' radius, two 45° elbows or a detour with a 45° bend. See the photos below.

T-duct -90 °	T-duct with detour	Trouser-leg duct
		
		
May work	Recommended by Absolent	Recommended by Absolent

Avoid using short bends, e.g. fittings with a small inner radius.

PLEASE NOTE! Avoid ducts with "sharp" 90° bends and sharp T-ducts to minimize the pressure drop in the duct system.

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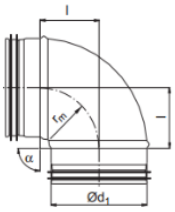
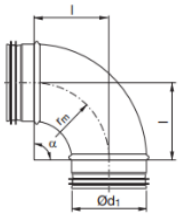
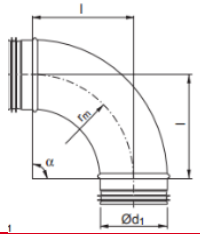
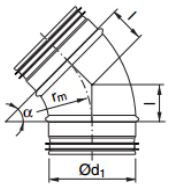
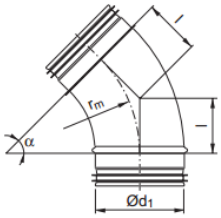
Duct elbow, 90° Short	Duct elbow, 90° Standard	Duct elbow, 90° Long
		
$r_m \approx 0{,}6 \times d_1$	$r_m \approx 1 \times d_1$	$r_m \approx 1{,}5 \times d_1$
May work	Recommended by Absolent	Recommended by Absolent

Instead of using a 90° duct elbow, it is preferable to use two 45° duct bends instead, as they give a lower external pressure drop in the duct system. Keep in mind to use fittings with a large radius to minimize the pressure drop. The two 45° bends can be mounted with or without a bit of duct inbetween.

Pipe elbow, 45° Standard	Pipe elbow, 45° Long
	
$r_m \approx 1 \times d_1$	$r_m \approx 1{,}5 \times d_1$
May work	Recommended by Absolent

9.1.2 Enclosing the machine

To achieve a good working environment in the workshop, it is important to have well functioning general and process ventilation, which are optimized in relation to each other. Another prerequisite is that all machines are as well enclosed as possible, in order to minimize the risk of dirty process air leaking out. Try as far as possible to close all openings, if this is not possible, the airflow must be increased or the opening tided over with an air curtain.

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The enclosure is not included in the installation of the Absolent filter unit and associated ducting.

Please contact Absolent or one of Absolent's distributors for advice on how your machine can be enclosed most easily. There are many different solutions depending on the conditions.

Check the placement of the ducting on the machine. Preferably, it is placed at the top of the machine, as far away as possible from the processing zone and the machine door. Place a splash plate in front of the extraction hole to prevent that unnecessary amounts of oil are splashing or being sucked out from the machine, *see chapter 10.5.2, Splash plate*.

PLEASE NOTE! Place the duct connection of the machine as far away from the processing zone and the door as possible, and preferably at the top.

9.1.3 Calculation of the external pressure drop

External pressure drop means the total resistance created when air is transported to and from the filter unit. For Absolent filter units with built-in fans, there is a maximum external pressure drop the filter unit can handle without reducing the air flow. This figure can be read from the respective data sheet.

If the filter unit is placed on top of or close to the machine, the external pressure drop does not need to be checked or calculated.

If multiple machines are connected to a filter unit, and/or the filter unit is placed apart from the machines, the external pressure drop needs to be calculated/checked. The same applies when the filter unit's outlet is connected to a duct.

When calculating a pressure drop, you only need to calculate for the machine that generates the biggest pressure drop, usually the one that is located farthest from the filter unit.

The external pressure drop of the duct system is calculated by summating all constituent parts. The pressure drops of those parts are specified in the duct manufacturer's catalog. Please see the example below.

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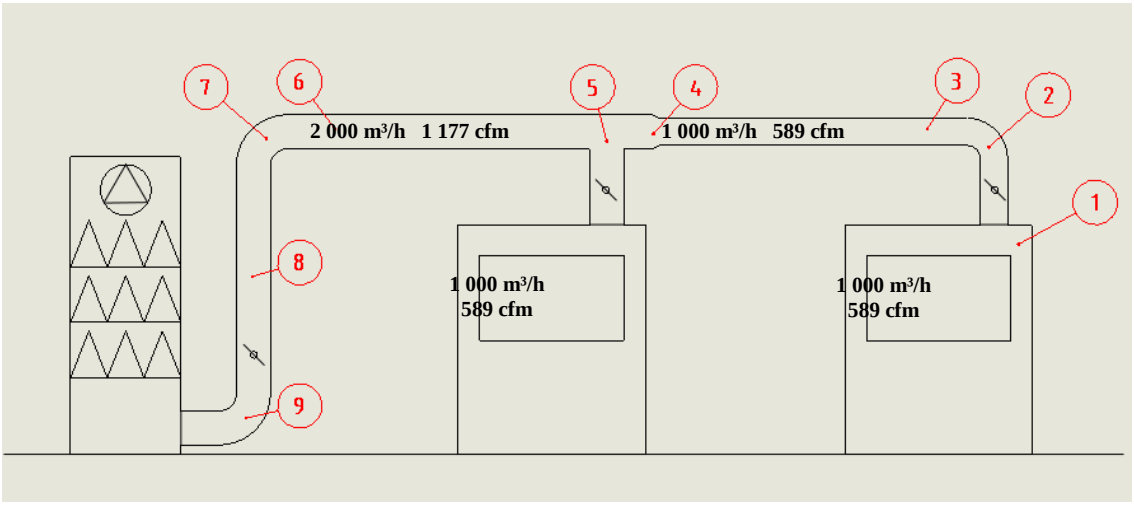

	Part	*Amount*	*Pressure drop*
1	Machine	1 pc	100 Pa / 0.402 in WC
2	90˚ bend (Ø 160mm/6”)	1 pc	35 Pa / 0.141 in WC
3	Duct (Ø 160mm/6”)	3 m / 10 foot	40 Pa / 0.161 in WC
4	Reducer (Ø 200=>160mm / 8” => 6”)	1 pc	26 Pa / 0.104 in WC
5	T-bend (Ø 200 mm/8”)	1 pc	15 Pa / 0.060 in WC
6	Duct (Ø 200 mm/8”)	3 m / 10 ft	50 Pa / 0.201 in WC
7	90˚ bend (Ø 200 mm/8”)	1 pc	48 Pa / 0.193 in WC
8	Duct (Ø 200 mm/8”)	2 m / 6,7 ft	40 Pa / 0.161 in WC
9	90˚ bend (Ø 200 mm/8”)	1 pc	48 Pa / 0.193 in WC
Total pressure drop .			402 Pa / 1.614 in WC

PLEASE NOTE! If multiple machines are connected to a filter unit, and/or the filter unit is placed apart from the machines, the external pressure drop needs to be calculated/checked.

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9.1.4 Air speed in circular ducts

The following tables show the air speed in circular ducts by different air flows and duct diameters. In order to avoid oil accumulations in the ducts with the risk of leakage as a result, the air speed shall be ≥ 15 m/s which corresponds to 2952 ft per minute, with a maximum air speed of 18 m/s resp. 3510 ft per minute. The air speed in ducts mounted after the filter unit can be as low as you want.

	Airflow, [m³/h]																		
Duct diameter [mm]	300	**500**	**600**	700	**1000**	1250	1500	1750	**2000**	2500	3000	3500	**4000**	6000	7000	**8000**	9000	10000	20000
100	11	18	21																
125	7	**11**	**14**	16	23														
160		7	8	10	**14**	17	21												
200					9	11	13	15	**18**	22									
250						7	8	10	11	14	17	20	23						
300								7	8	10	12	14	16	24					
315									7	9	11	12	**14**	21	25				
400											7	8	9	13	15	**18**	20	22	
500														8	10	11	13	14	
630																7	8	9	18
710																		7	14
800																		6	11
1000																			7

Tabell 9-1: Air speed in m/s, bold text shows the standard values for Absolent filter units.

	Airflow, [cfm]															
Duct diameter [in]	**300**	**600**	1000	**1200**	1500	2000	**2350**	2500	3000	3500	4000	4500	**4700**	5000	5500	5750
5	**2201**	4403														
6	1529	**3057**														
8		1720	2866	**3439**	4299											
10			1834	2201	2752	3669	4311									
12				1529	1911	2548	**2994**	3185	3822	4459						
14					1404	1872	2199	2340	2808	3276	3744	4212	**4399**			
16						1433	1684	1791	2150	2508	2866	3225	3368	3583	3941	4120
18								1415	1699	1982	2265	2548	2661	2831	3114	3255
20									1376	1605	1834	2064	2155	2293	2522	2637
22											1516	1706	1781	1895	2085	2179
24												1433	1497	1592	1752	1831
26														1357	1492	1560
28																1345
.																

Tabell 9-2: Air speed in fpm (ft/minute), bold text shows the standard values for Absolent filter units.

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9.1.5 Duct thickness

Ventilation ducts differ in material thickness depending on the diameter and the brand. Different types and brands of ducts can withstand different amounts of underpressure before they collapse.
If a duct system is very long or you expect a big underpressure for other reasons, the duct system's strength needs to be checked. In case of risk, the duct thickness needs to be increased or the duct system reinforced.
Another way to solve this is to use two smaller ducts instead of one large. The tables below give an indication of the pressure Lindab ducting can withstand.
Check with your duct supplier which underpressure the different duct systems and diameters can handle.

Duct diameter, [mm]	Plate Thickness, [mm]	Max. permitted pressure [Pa]
100	0,45	-21400
125	0,45	-17000
160	0,5	-11700
200	0,5	-7200
250	0,5	-4300
315	0,55	-4800
400	0,55	-3000
500	0,7	-4000
630	0,7	-3800
800	0,8	-3200
1000	0,9	-1000

Tabell 9-3: Maximum permitted underpressure for spiro ducting (Lindab).

PLEASE NOTE! The maximum permitted underpressure varies between different duct systems and their dimensions. Always check with your duct supplier which underpressure their duct dimensions can handle.

PLEASE NOTE! A duct system with a large underpressure risks to collaps if it is not correctly dimensioned. Always check how much underpressure the different duct dimensions and thicknesses can handle.

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Duct diameter, [inch]	Plate Thickness, [gauge]	Max. permitted pressure [inWC]
4”	28	-104
6”	28	-60
8”	28	-38
10”	28	-15
12”	28	-8
14”	28	-9
16”	26	-21
18”	26	-17
20”	26	-15
22”	26	-14
24”	26	-13
26”	24	-12
28”	24	-10
30”	24	-9
32”	24	-8
34”	24	-7
36”	24	-7
38”	24	-4
40”	24	-4
42”	22”	-4
44”	22”	-4

Tabell 9-4: Maximum permitted underpressure for spiro ducting (Lindab) for the US.

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9.2 Ducting

9.2.1 General

The selection of duct systems for process ventilation requires a lot of thought. The air that is transported in the duct system contains a large amount of pollution in the form of oil, which must not begin to leak out. It is also important to minimize the pressure drop in the duct system in order to maintain the air capacity of the filter unit, see chapter: 9.1 Design of the duct system

9.2.2 Spiro

One of the world's most common duct systems for general ventilation is spiro ducts. If thy are used for process ventilation, the spiro ducts must be liquid-proof. They are easy to assemble and there are many different parts to choose from.

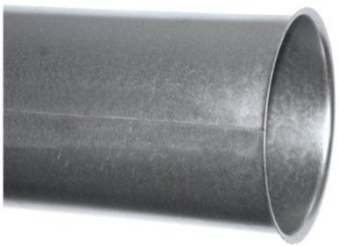
PLEASE NOTE! The duct system used before Absolent filter units must always be liquid-proof.

9.2.3 Ducts with a strap edge/flange

Ducts with a strap edge/flange can also be used as duct system for oil mist/smoke. There is a great variety around the world, but sealing and connecting is done in a similar way. For all these systems, a seaming machine is needed in order to get the ducts into the correct length.
There are two different manufacturing methods, longitudinal folded and welded ducts.

9.2.3.1 Longitudinal folded / laser welded ducts

This duct system is available in several versions, with 1 mm galvanized sheet metal as the most common. Common suppliers are Lajac and Scandab.



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9.2.3.2 Welded duct/black plate

Even welded tubes are available in different versions and dimensions, 2 mm black plate is the most common. In many parts of the world, those ducts are painted. Common suppliers are Jacob and S&W.

9.2.4 Stainless ducting (Spiro)

A stainless steel duct system should be used if you know that there is a risk of corrosion. Common suppliers are Lindab and FläktWoods.

9.2.5 Plastic ducts

Plastic ducting is used for applications with plenty of moisture, for example washing machines. We recommend ducts in polypropylene with built-in flame retardant (PPs).
For this system, hot-air welding is used to assemble the duct components. This means that it is not quite as easy and flexible to install new or to alter existing ducting. In Sweden, it is also required that the installer has the appropriate qualification (hot work qualification) in order to perform this work. Common suppliers are Colasit, Beck or Arex.

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9.2.6 Flexible hose

In some cases, the ducting cannot be connected directly to a machine, and a more flexible connection is required. If the connection is placed on a moving door, for example, a flexible hose can be used. Preferably, use as little flexible hose as possible, as it generates a high pressure drop.

The hose is easy to install and is put in place with the help of hose clamps. To make the installation work, it is important to remove the spiral about 5-7 cm from both edges of the hose (see pictures below). We recommend that you use polyuretane hose.

PLEASE NOTE! Flexible hoses generate high pressure drops and should be used as little as possible! Don't forget to remove the spiral in both ends of the hose!

PLEASE NOTE! Ensure that the hose is "stretched" in order to avoid an unwanted liquid trap.

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9.2.7 Choice of duct systems - Recommendation

Absolent's recommendation of duct systems based on the type of process:

	Spiro duct	Leakage-proof spiro duct	Duct with strap edge / flange	Stainless steel duct	Plastic duct	Flexible hose[1)]
Cutting process - Emulsion	X	●	●	○	○	○
Cutting process - Neat oil	X	○	●	○	○	○
Grinding	X	●	●	○	○	○
AL-Diecasting	X	○	●	○	○	X
Extruction of washing machine	X	○	○	●	●	○
Turning	X	●	●	○	○	○
Milling	X	●	●	○	○	○
Hardening	X	○	●	○	○	○
Machine centers	X	●	●	○	○	○
Drilling	X	●	●	○	○	○
Cold drawing	X	○	●	○	○	○
Cold forming	X	○	●	○	○	○
Hot forming	X	○	●	○	○	○
Gear cutting	X	●	●	○	○	○
Food processes	X	○	○	●	○	○
After the filter unit	●	○	○	○	○	○

● = Recommended by Absolent ○ = May work X = Will not work

[1)] A flexible hose is always used in combination with other duct systems. If a flexible connection is required, a hose may be used for a short distance.

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Absolent's recommendation of piping system based on the requested properties or conditions:

	Spiro duct	Leakage-proof spiro duct	Duct with strap edge / flange	Stainless steel duct	Plastic duct	Flexible hose[1)]
Weight	X	●	○	○	○	○
Corrosion persistance	X	○	○	●	●	○
Chemical persistance[2)]	X	○	○	○	○	○
Leak tightness	X	○	●	○	○	○
Generates low pressure drops	X	○	●	○	○	X
Persistance to high underpressure	X	○	●	○	○	X
Persistance to temperatures ≤ 80°C	X	○	○	○	○	○
Persistance to temperatures > 80°C [3)]	X	○	○	○	○	○
Easy to keep clean	X	○	●	○	○	○
Flexibility – easy to alter / move	X	●	○	○	○	○
Easy installation	X	●	○	○	○	○
Variety of components	X	●	○	○	○	○
Installation after the filter unit	●	○	○	○	○	X
No special qualification needed	●	●	○	○	X	○

● = Recommended by Absolent ○ = May work X = Will not work

[1)] A flexible hose is always used in combination with other duct systems. If a flexible connection is required, a hose may be used for a short distance.

[2)] important to always check what applies for each chemical.

[3)] at temperatures above 80°C, special sealings are required. Check with your duct supplier what they have to offer.

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9.3 Dampers

9.3.1 General

To evacuate the right amount of air from a processing machine, the "correct" airflow has to be set. It is utterly important that the airflow is tuned in correctly for each machine. A too low airflow means that dirty air will leak out from the machine into the workshop, while a too high airflow may empty the machine of oil and the filter cassettes get unnecessary high loads with a shortened lifespan as a result.

Ideally, EcoDrive is used to optimize the installation.
EcoDrive = an optimized function that generates energy and environmental savings and provides a lower total cost (LCC).

For installations without EcoDrive, the correct airflow is set manually with an adjustable damper that is mounted on the filter unit or at the respective machine.

If a machine is evacuated by a filter unit equipped with EcoDrive, the latter is used for the adjustment of the airflow.

If two or more machines are evacuated by one filter unit equipped with EcoDrive, both adjustable dampers and closing valves need to be installed. Adjustable dampers are used to set the correct airflow from each machine. For more information about how closing valves work, see *chapter 9.3.3 Closing valves/motor-driven damper*.

9.3.2 Adjustable dampers

Adjustable dampers shall be installed as close as possible to the suction point for each machine, in order to set the correct airflow.

On the market, there are plenty of different varieties and brands of adjustable dampers. For process ventilation, sealed adjustable dampers do not work, because there is a risk that the ducting collapses of underpressure if the dampers are closed.
Within general ventilation, Iris dampers are often used for the airflow adjustment, but these are not either recommendable for process ventilation, as they work poorly in dirty environments.

Unsealed adjustable damper	***Sealed adjustable damper***	***Iris damper***
Recommended by Absolent	Disapproved by Absolent	Disapproved by Absolent

PLEASE NOTE! Adjustable dampers must not be sealed / extreme fit.

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9.3.3 Closing valves/motor-driven dampers

If two or more machines are evacuated by one filter unit equipped with EcoDrive, both adjustable dampers and closing valves need to be installed for each machine. When one of the machines shuts down, it sends a signal to the closing valve for the machine, which then closes automatically. EcoDrive ensures that the fan will spin down and the total airflow decreases while the airflow from the other machines remains unchanged. This generates less power consumption and extends the life of the filter cassettes, which both contribute to environmental and cost savings.

9.3.4 Fire dampers

With electric equipment, there is always a risk of fire, sometimes bigger, sometimes smaller. It is always important to analyze how big the fire risk is for each machine.
For a machine with fire risk, detection equipment and fire dampers are to be installed in order to minimize the possible damage caused by a fire.

At the event of fire and/or excessive heat, a signal is being sent from the detection equipment in the machine to the fire damper on the suction pipe, which automatically closes the damper, thus preventing further proliferation. The signal is also to be connected to the fan unit, so the filter unit will automatically shut down.

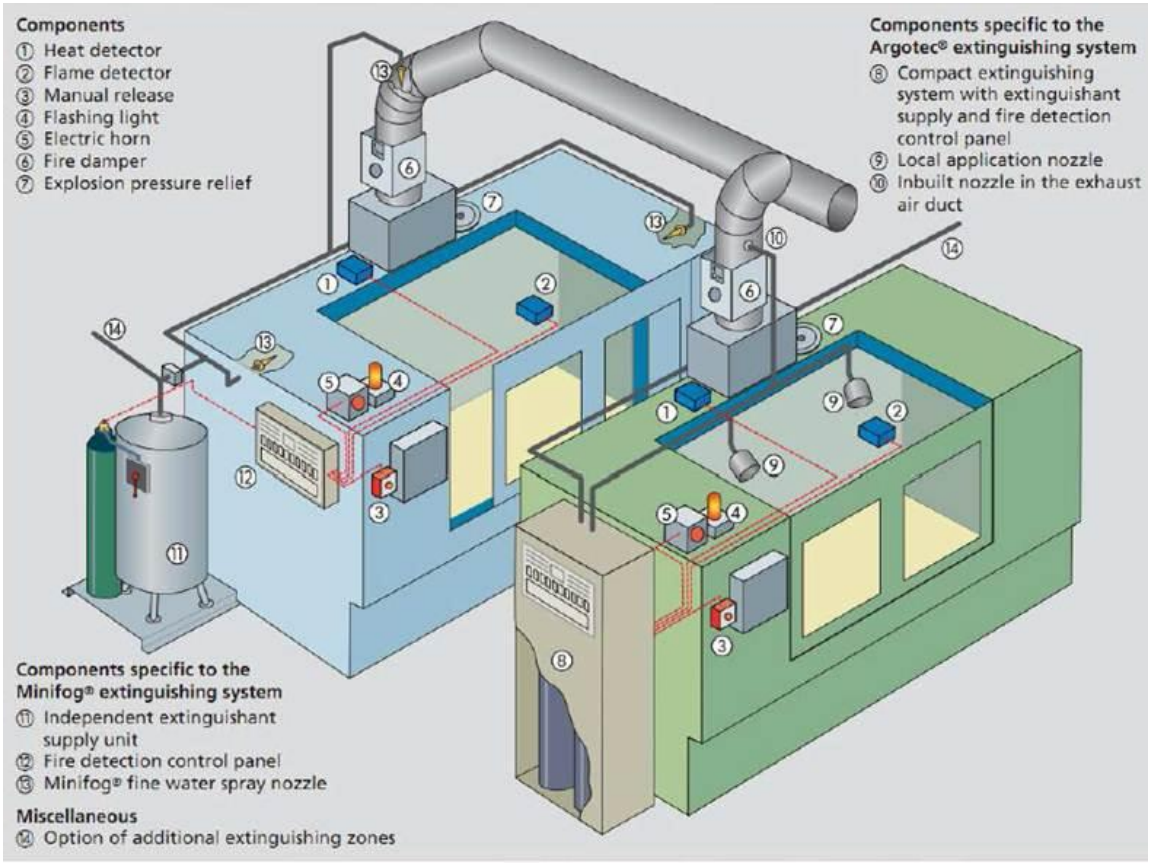
Components
① Heat detector
② Flame detector
③ Manual release
④ Flashing light
⑤ Electric horn
⑥ Fire damper
⑦ Explosion pressure relief
Components specific to the Argotec® extinguishing system
⑧ Compact extinguishing system with extinguishant supply and fire detection control panel
⑨ Local application nozzle
⑩ Inbuilt nozzle in the exhaust air duct
Components specific to the Minifog® extinguishing system
⑪ Independent extinguishant supply unit
⑫ Fire detection control panel
⑬ Minifog® fine water spray nozzle
Miscellaneous
⑭ Option of additional extinguishing zones

Image 9.3.4-1: Exemple for detection equipment and fire dampers

PLEASE NOTE! For installations with fire hazard, please contact a certified consultant who investigates what kind of detection equipment and fire dampers are to be used and how the ducting and dampers are to be placed.

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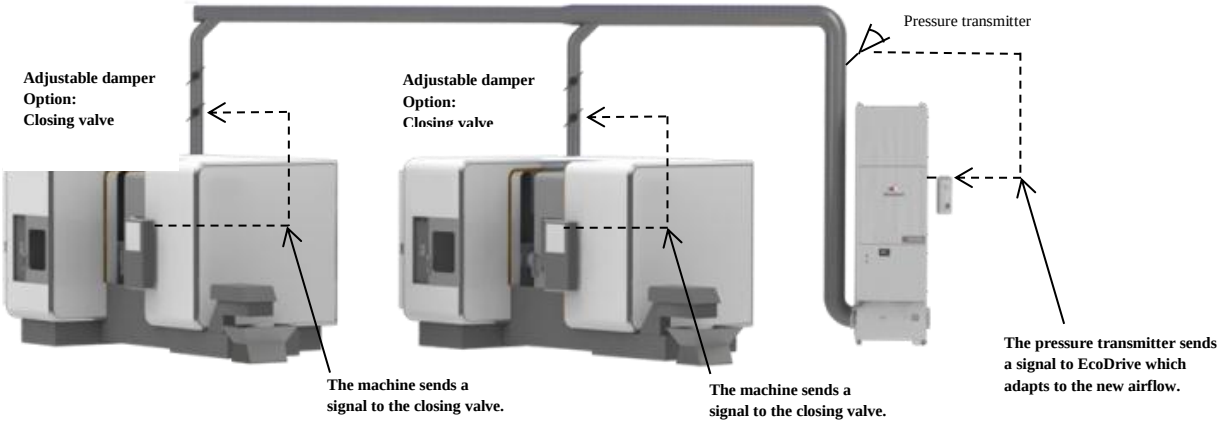
10 Installation

10.1 Principle drawing of the installation

Without EcoDrive

With EcoDrive



10.2 Placement of the damper

All types of dampers shall be placed as close as possible to the suction point in the machine. Keep in mind that the shaft must be horizontal in order to minimise the risk of leakage.

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10.3 Installation of duct systems

10.3.1 Sealing of duct systems - General information

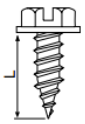
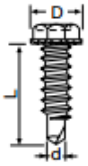
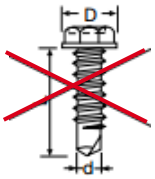
All splices in a duct system for process filtration must be sealed before being assembled in order to prevent leakage. The different duct systems are sealed in different ways.

We recommend a sealant that is based on MS-polymers. Absolent uses
Marine & Engineering (Marin & Teknik) from Casco for the sealing of both duct systems and within filter units.

Please contact Absolent or Absolent's distributors for further recommendations of sealants. Absolent provides Marine & Engineering as an accessory.

10.3.2 Approved fasteners

It is important to use the right type of screw for the assembly of duct systems. If the wrong fastener is used, there is a risk of leakage. It is also important how the screw is placed. Screws must never be placed at the bottom of the duct.

Screw with spiky tip	*Screw with reduced drillbit*	*Screw with drillbit*
		
Very dense. Strong, as it forms a collar in the thin plate.	Very dense. Strong, as it removes only a small part of the thin plate.	Not dense. Weak, as it removes a large part of the thin plate.
Approved by Absolent	Approved by Absolent	Disapproved by Absolent

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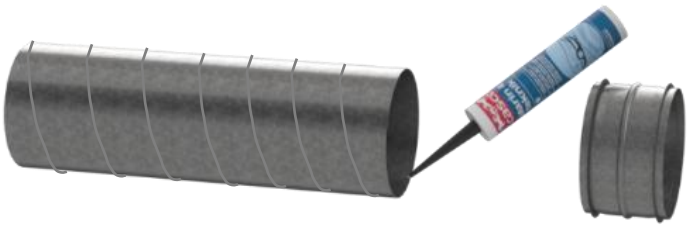
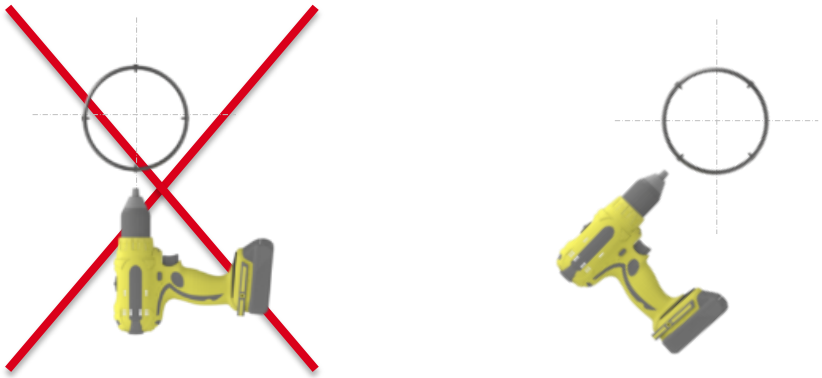
10.3.3 Sealing of Spiro ducts

Spiro duct systems have a rubber gasket on all parts that shall be stuck into the duct. This gasket is not sufficient, however, for sealing duct system aimed for oil mist or oil smoke.

- Put a smooth bead of sealant approximately 1 cm into the pipe. It is utterly important that the string is smooth and runs all the way around the inside of the tube.
- Insert the next detail into the duct.
- Screw the parts with a self-cutting tapping screw.
- Make sure that no screws are placed on the bottom of the duct, because of the risk of leakage.





PLEASE NOTE! There must not be any screw at the bottom of the duct.

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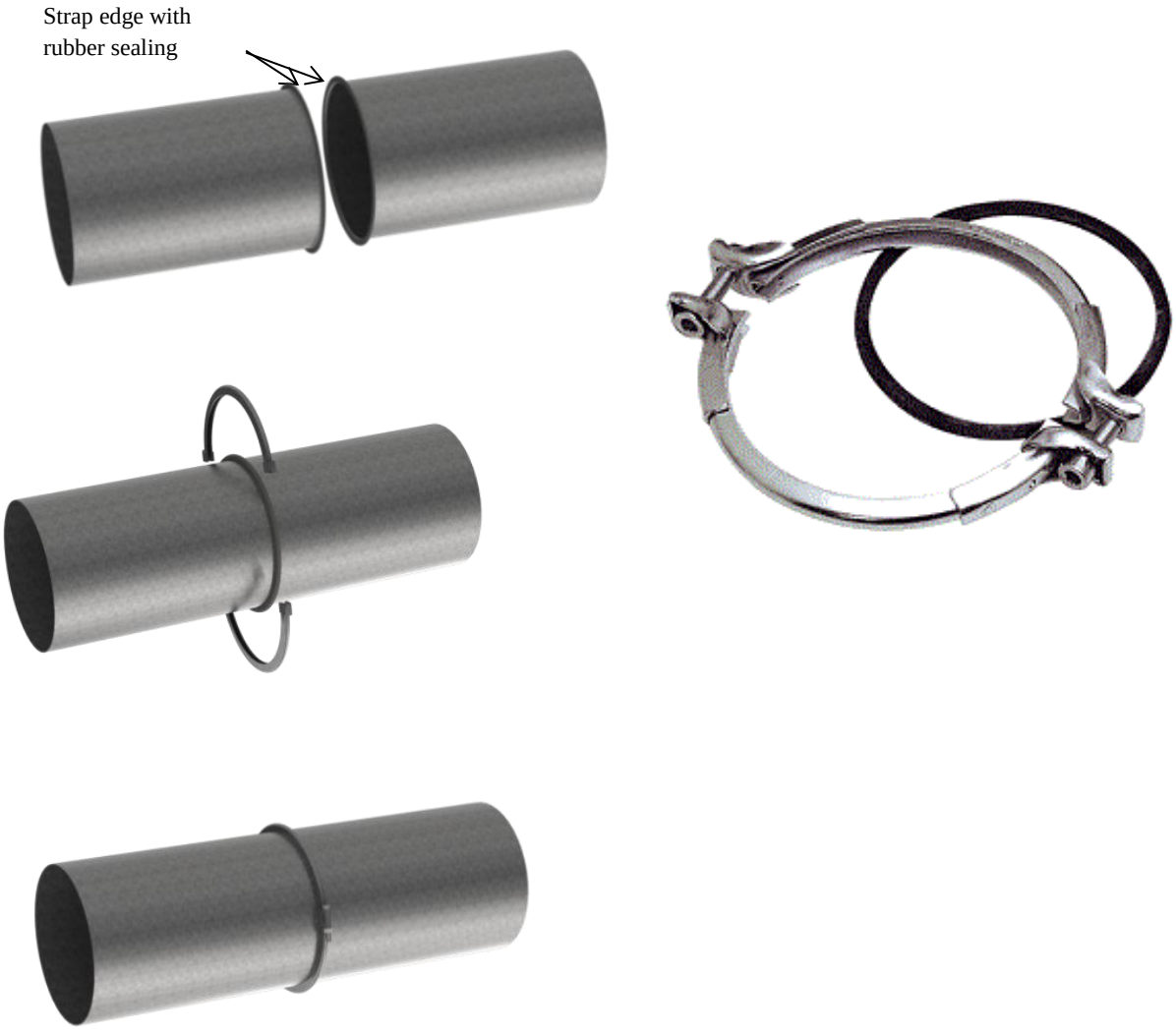
10.3.4 Sealing of longitudinal folded / laser welded ducts

Depending on the type of straps used for the assembling/locking of the duct system, there are several different options.

For most options, we recommend that the parts are first taped together with a soft plastic tape. The number of laps varies depending on the type of straps used. The tape will help to hold the parts together, but above all reduce the risk of leakage.

Option 1-straps
The ducts and fittings have a strap edge at the ends and are put together with the help of fast straps without sealing.

- Before the duct parts are placed against each other, a rubber sealing is threaded on the strap edge of both parts.
- Place the ends against each other
- Screw the strap with a screw and nut.



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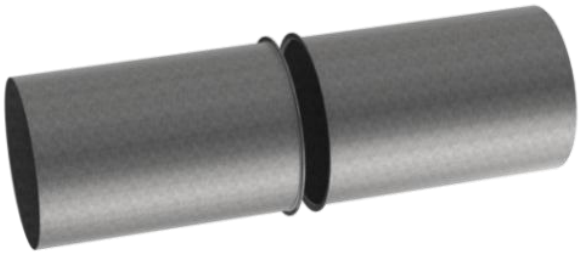
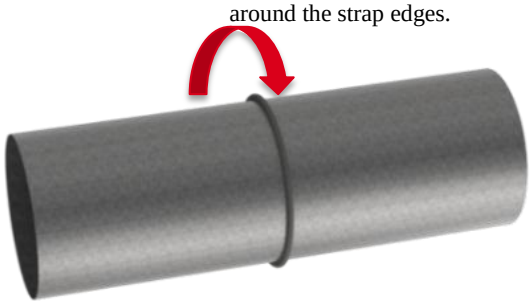
Option 2-Single strap

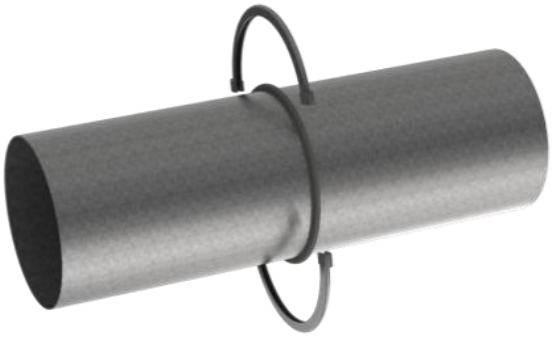
The ducts and fittings have a strap edge at the ends and are put together with the help of single straps without sealing.

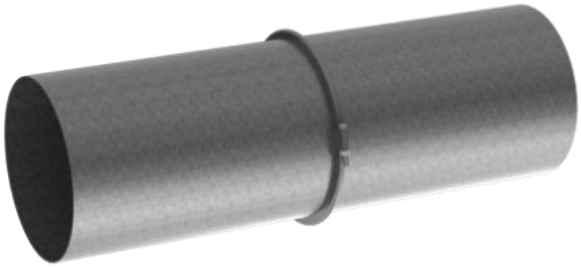
- Place the duct ends against each other
- Tape the strap edges together with a plastic tape, at least 2-3 laps around the joint.
- Then screw the simple strap together with a screw and nut.



Tape 2-3 loops of plastic tape around the strap edges.







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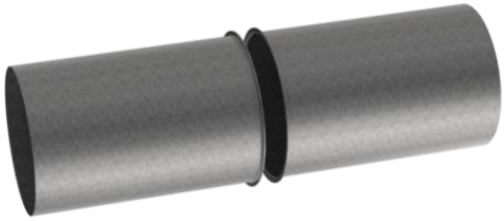
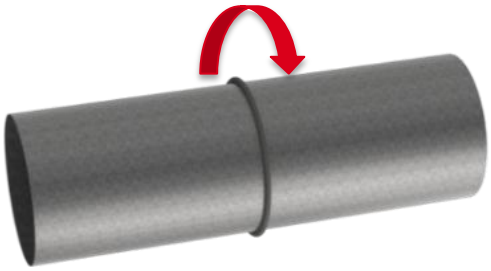
Option 3-Quick strap

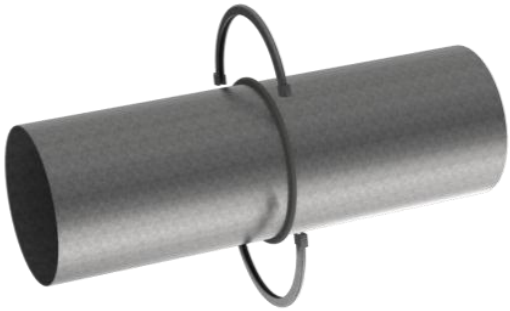
The ducts and fittings have a strap edge at the ends and are put together with the help of quick straps with integrated gaskets.

- Place the pipe ends against each other
- Tape the strap edges together with a plastic tape, just over one lap around the joint. Then place the quick strap.
- Requires great accuracy so that the connections will be tight.



Tape just over one lap around the edges with plastic tape.





PLEASE NOTE! It is important that the strap is placed horizontally on the duct.

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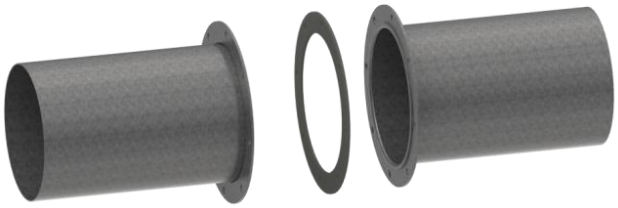
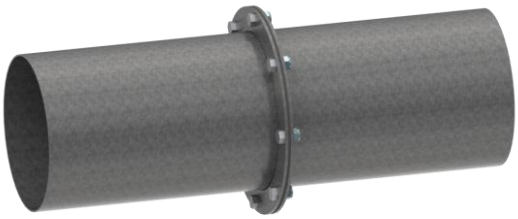
Option 4-Flanges

The ducts and fittings have flanges at the ends and a gasket is placed between the flanges. The gasket has holes that fit with the holes on the metal flanges.





Option 1 Straps	***Option 2 Simple straps***	***Option 3 Quick straps***	***Option 4 Flanges***
No tape	2-3 laps with tape	1 lap with tape	No tape
2 rubber gaskets, one on each stem	No extra rubber gasket	No extra rubber gasket	1 gasket between the flanges.
Recommended by Absolent	Works	Works	Works

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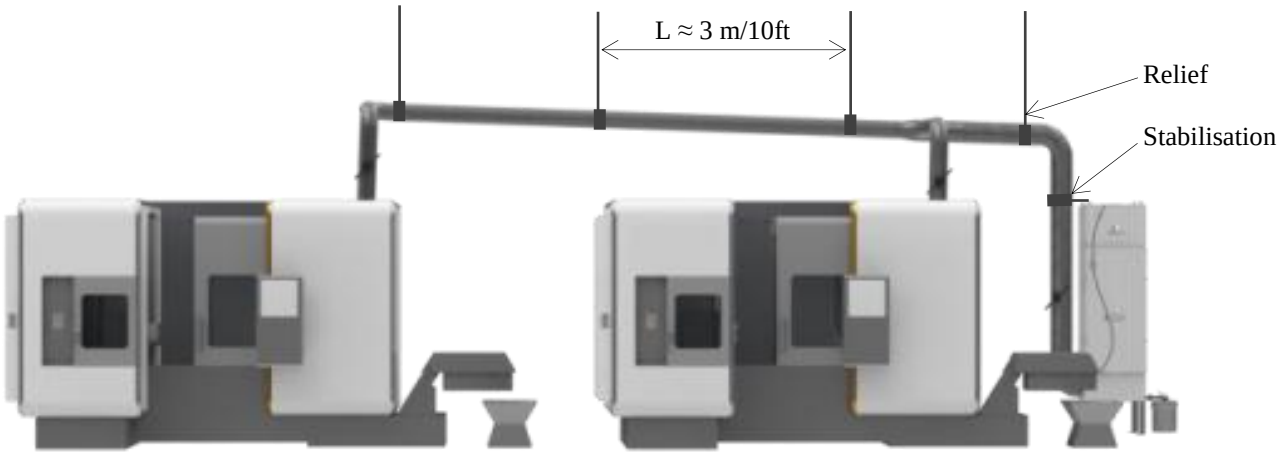
10.3.5 Sealing of plastic ducts

For the sealing of plastic tubes, the parts are first put together and then warmed up all the way around. Finally, a welding wire is welded over the joint.

10.3.6 Suspension of duct systems

It is important that the suspension of a duct system for process ventilation is made in a correct way, so the pipes don't start to falter or vibrate. Stabilize and/or attache the duct system against the Absolent filter unit, walls or ceilings (see below). Long ducts should be suspended/relieved after each elbow, detour or connection. In the case of long straight pipelines, there should be a relief after each splice. (Split between suspension/relief around every 3 metres/10ft.)

To relieve the connection into the Absolent filter unit, a suspension should be placed as close to the first bend on the horizontal duct as possible. Just before a horizontal bend, a suspension is to be placed in order to relieve the weight.



PLEASE NOTE! The distance between the suspensions/reliefs should be around 3 meters/10 ft, and a suspenstion is needed after each elbow, detour or connection.

If plastic ducting is used, the suspensions/reliefs are to be set more frequent, because plastic ducts sag over time. We recommend a distance of about 1,5-2 meters/5-6.5 ft between the suspensions/reliefs.

PLEASE NOTE! The whole weight of the duct system has to be carried by the suspension, i.e. it must never burden the filter unit or the machine!

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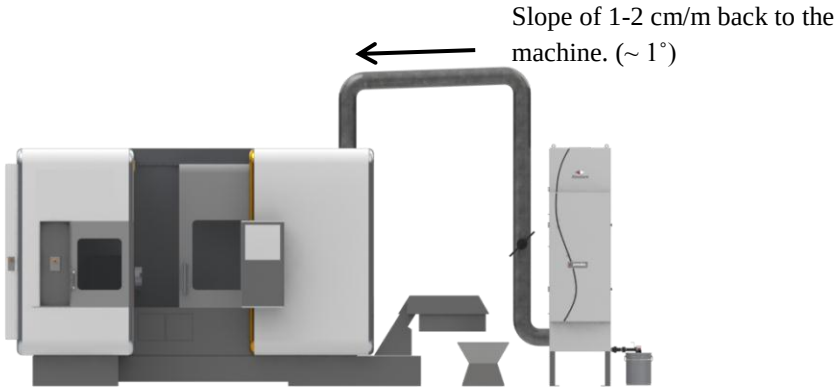
10.3.7 Slope of the duct system

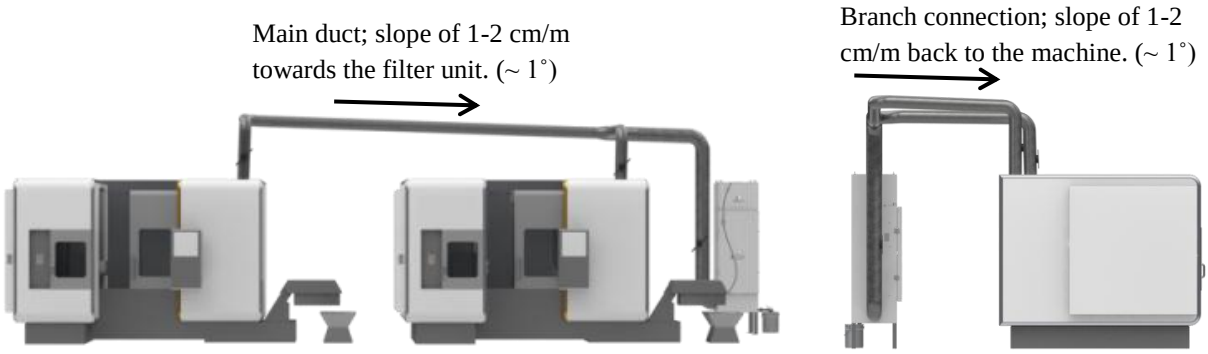
The duct system between the machine and the filter unit, i.e. the ducts carrying the dirty process air, shall always be installed with a slight tilt to prevent the accumulation of oil in the ducts. Oil accumulations often lead to leakage, which results in unnecessary work.

Depending on the installation, the ducts should either tilt towards the machine or the Absolent filter unit.

If the filter unit serves one machine, the duct system shall tilt towards the machine so that the oil drains back.



If the filter unit serves two or more machines, the main duct shall tilt towards the Absolent filter unit, other ducts shall tilt towards the machine so that the oil drains back. Here too, the slope shall be about 1-2 cm/m.



PLEASE NOTE! The duct system shall have a slope so that the oil does not accumulate and begin to leak. The slope should be 1-2 cm/m and tilt either towards the Absolent filter unit or back to the machine depending on the installation.

10.3.8 Drainage of the duct system

Long ducts sometimes need to be drained off oil to avoid oil accumulations with leakage as a result. Make the duct tilt slightly and connect a "draining hose" to a T-duct or a detour. Don't forget to make a liquid trap to prevent that air leaks into the system.. See Chapter 8.2 Return Oil Connection.

If the duct system is led around a beam or similar, a drainage needs to be connected.

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10.4 Connection to the filter unit

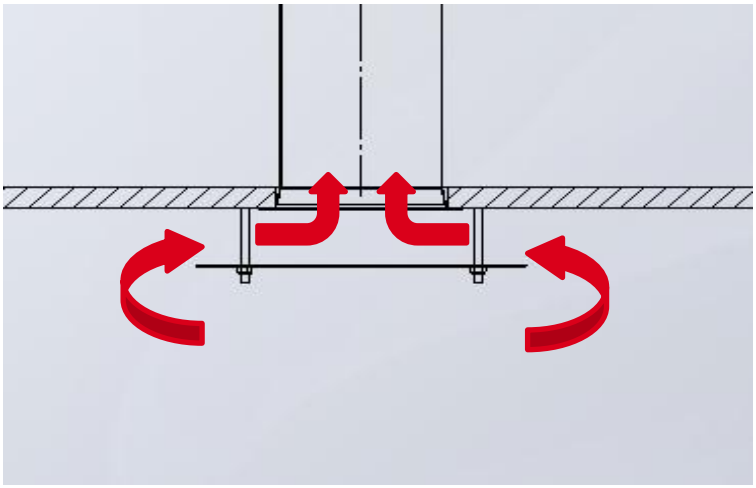
Absolent delivers filter units both with and without connections. We use ILU-flanges where connections are included. Other connections are available on request. Filter units called "compact" (C) have one connection point, while the larger filter units have two connection points. Additional / differently placed connection points are available on request.

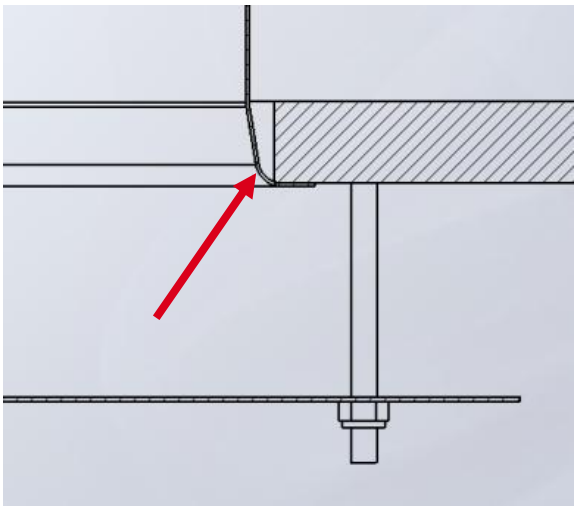
10.5 Connection to the machine

10.5.1 General

Many machines have connection holes designed for process filtration. If there are none, a hole is made. The hole is preferably to be placed at the top of the machine, as far from the processing zone and the door as possible. This is to prevent chips from entering the filter unit, as well as to reduce the amount of oil that is sucked into the filter unit. If the hole is too close to the processing zone, coolant/oil/chips "squirt" into the hole, and the filter unit will drain out too much oil from the machine. To prevent this, place a splash plate to protect your connection from the direct spray of oil and chips.

When a hole is made, some sort of connection or flange is to be used. The duct is to be placed at the ceiling level, i.e. it must not stick down into the machine. Remember to use a connection/adapter with a radius to avoid sharp 90˚ corners, which create turbulence.





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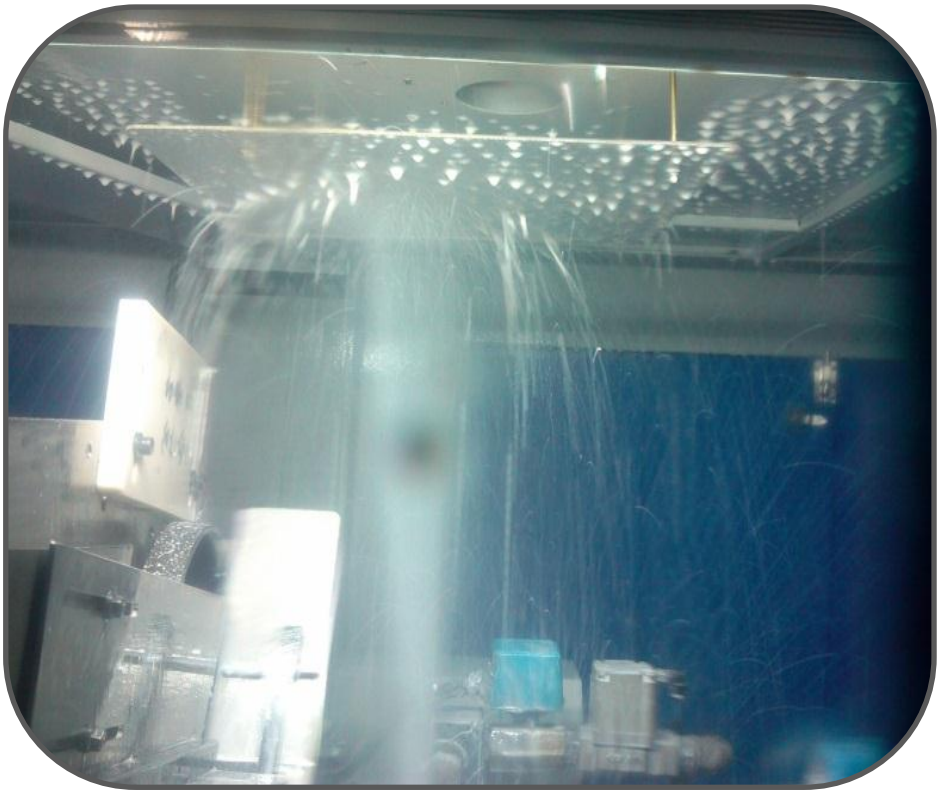
The air velocity in the duct is determined by its connection diameter. The larger the diameter, the lower the velocity in the duct system. Absolent recommends an air velocity of approximately 5 m/s (985fpm) into the duct and about 15-18 m/s (2955-3545 fpm) within the duct system. The velocity into the duct shall not exceed 10 m/s (1970fpm). It can be reduced or increased by changing the diameter.
At a high inlet speed, there is a risk that too much coolant/oil is sucked out from the machine. Is the air velocity too low, there is a risk of oil accumulations in the duct system with leakage as a result.

PLEASE NOTE! Place the connection as far as possible from the processing zone and the machine door. Use a splash plate to prevent chips and excessive oil from entering the filter unit.



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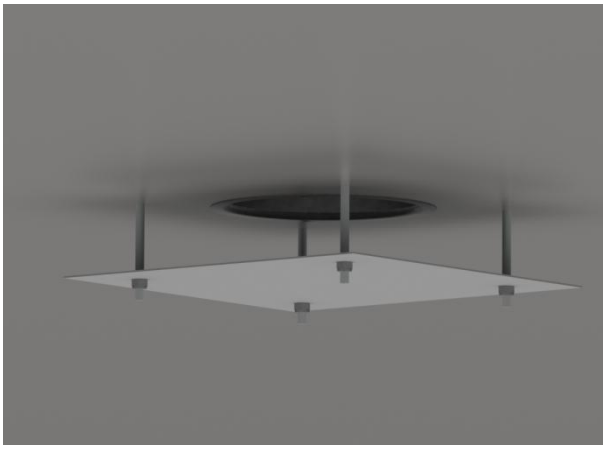
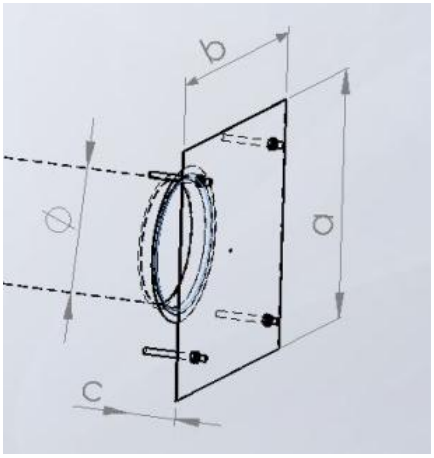
10.5.2 Splash plate

If the connection/ventilation hole in the machine is too near the processing zone, a splash plate needs to be screwed in front of the extraction point, to prevent that unnecessarily much oil is sucked out of the processing machine. It is just the oil mist and oil smoke that shall be evacuated into the filter unit.
A splash plate can also be used to reduce the air velocity into the duct system. We recommend an air velocity of 5 m/s (< 10 m/s) in order not to suck in too much oil in the duct system.





Connection diameter, Ø [mm]	Airflow, q [m³/h]	Height, a [mm]	Width, b [mm]	Distance, c [mm]
100	400	250	250	50
125	600	275	275	50
160	1000	310	310	50
160	1500	310	310	65
200	2000	350	350	65
250	2500	400	400	65
250	3000	400	400	75
315	3500	465	465	70
315	4000	465	465	80
400	4500	550	550	80
400	5000	550	550	80

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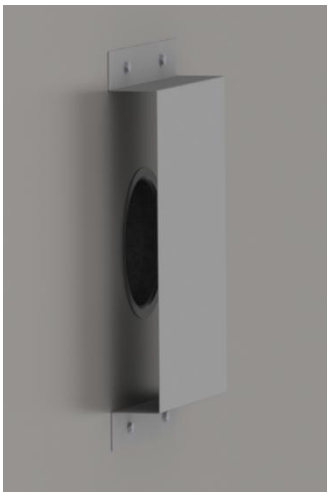

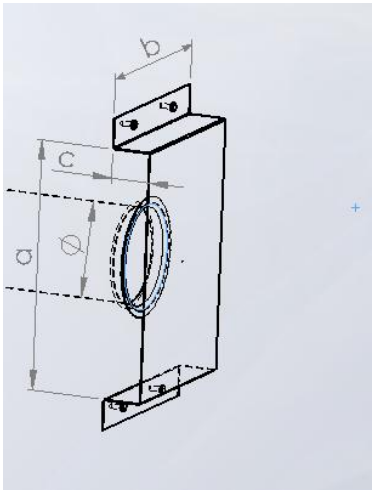

Connection diameter,Ø [mm]	Airflow, q [m³/h]	Height, a [mm]	Width, b [mm]	Distance, c [mm]
100	400	300	250	50
125	600	350	275	50
160	1000	420	310	50
160	1500	420	310	65
200	2000	500	350	65
250	2500	600	400	65
250	3000	600	400	75
315	3500	730	465	70
315	4000	730	465	80
400	4500	900	550	80
400	5000	900	550	80

10.5.3 Air velocity at the suction point

If no splash plate can be installed in front of the connection point, or if it is not possible to get the desired size of the connection, the diameter of the duct can be increased the last 1-2 m (3.5-6.5 ft) in front of the machine in order to minimize unnecessary evacuation of fluid.

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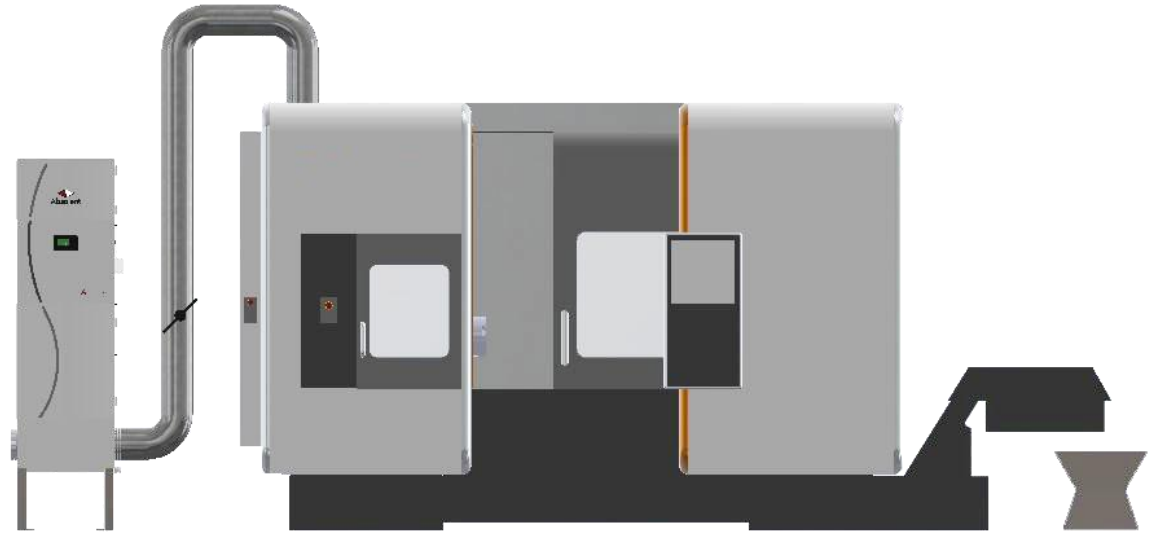
10.6 After the filter unit

10.6.1 Reventilation to the workshop

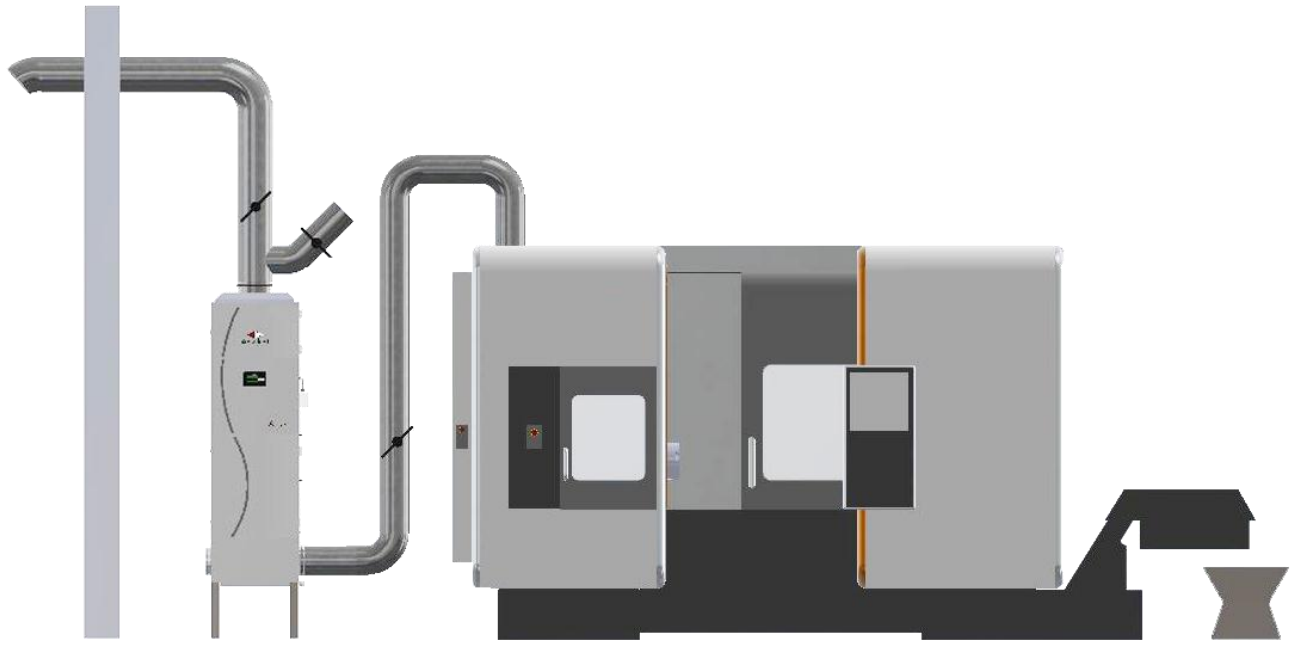
All Absolent A•mist and A•smoke filter units have a H13 filter as a standard, which means that the air is so clean that it can be released back into the workshop.



10.6.2 Duct connection

If the clean, filtered air shall be led away or to a heat exchanger, it can be equipped with a connection hood.

If a damper is installed after the duct connection, you can choose whether to return the air to the premises or lead it away. During winter, when the workshop is being heated, it is beneficial to take advantage of the warm, cleaned process air, while it can be sent out of the premises during the summer.



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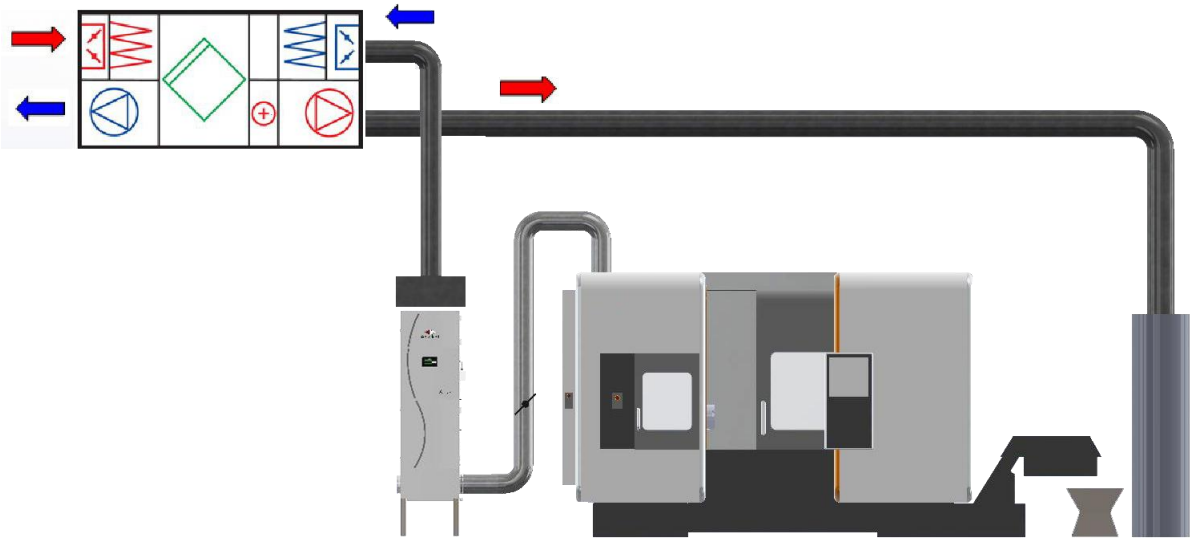
Ducting connected to the filter unit's outlet influences the external pressure drop and indirectly the unit's airflow, see 9.1.3 Calculation of the external pressure drop.
If the air shall be led to a heat exchanger with a sucking fan, there must be a draft diverter on the duct to prevent the fan from affecting the fan of the filter unit. The draft diverter must be constructed so that no air leaks out into the premises, i.e. have the right size and airflow.



PLEASE NOTE! If the filter unit's exhaust air shall be connected to a general ventilation unit, there must be a draft diverter on the duct to prevent the fans from interacting.

PLEASE NOTE! The duct system after the Absolent filter unit does not need to be liquid-proof. It does not need to slope and connections and splices do not need to be sealed because the transported air is now clean.

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11 Electric installation

11.1 General

In order to have a valid guarantee, all electric connections must be carried out by qualified personnel and in accordance with the laws of each country. The electric data of the fan motor is specified on the filter unit's machine plate. If the filter unit is equipped with other electric equipment, it has to be connected according to the enclosed wiring diagram.

Absolent oil mist and oil smoke filters can be adapted to the customer's needs and to different applications. The range of accessories includes both starting equipment and other electric equipment.

All Absolent filter units with integrated fan are standardly equipped with wired cables from the fan to the terminal block on the side of the filter unit.

11.2 First start of the filter unit

11.2.1 Checklist

- The filter cassettes are placed correctly
- The filter cassettes are properly secured
- The fan rotates in the right direction
- A•monitor shows “green" on all filter stages
- Pump and drainage are properly connected

11.2.2 Airflow adjustment

When the installation of ducts and filter units is finished, the airflows from the different machines are adjusted in order to obtain an optimal function. The airflow has to be adjusted according to Absolent’s calculations where the need for each machine is specified.

Drill a measuring hole in the duct connection of the machine and insert a flow meter. Drill on the top side of a horizontal duct or the side of a vertical duct. Never drill on the bottom side of a horizontal duct.
When the adjustment is finished, plug the holes with a plastic plug in order to avoid leakage.

PLEASE NOTE! Never drill a hole on the bottom side of a horizontal duct!

If you do not have access to a flow meter, you can adjust the airflow by using a new H13 filter (Hepa filter). Place the filter cassette(s) into the filter unit and start it. Then read of the electronic pressure gauge and adjust the airflow to the correct value. See below.

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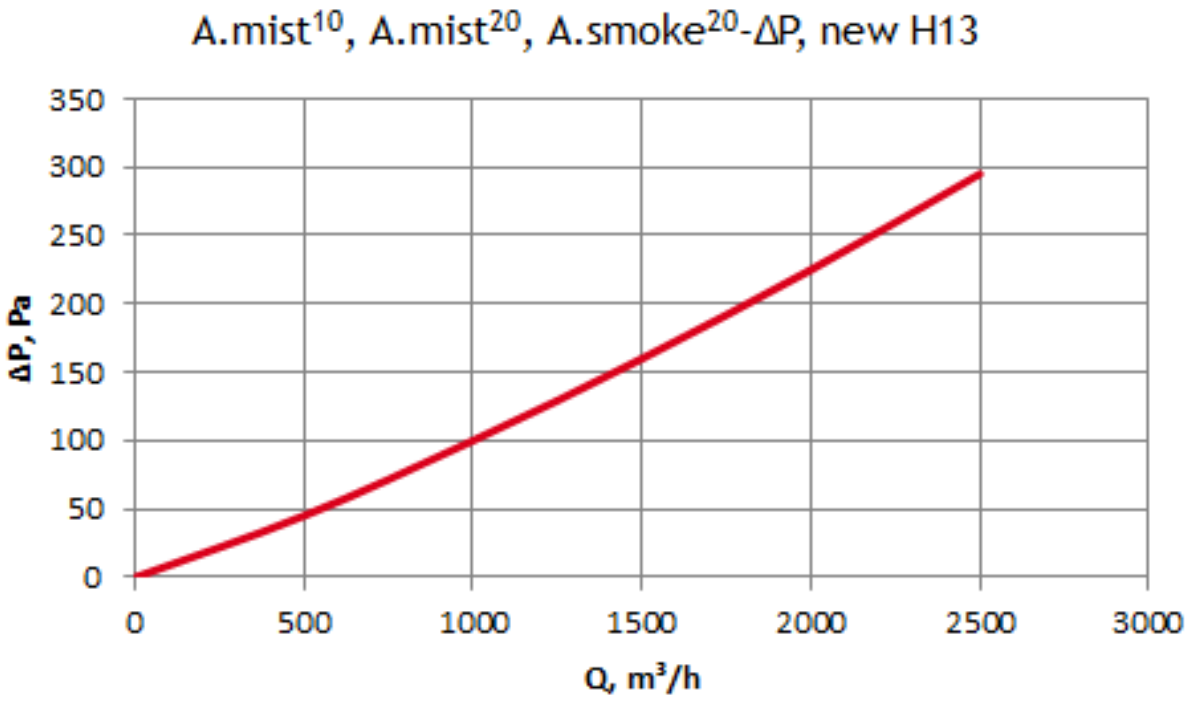
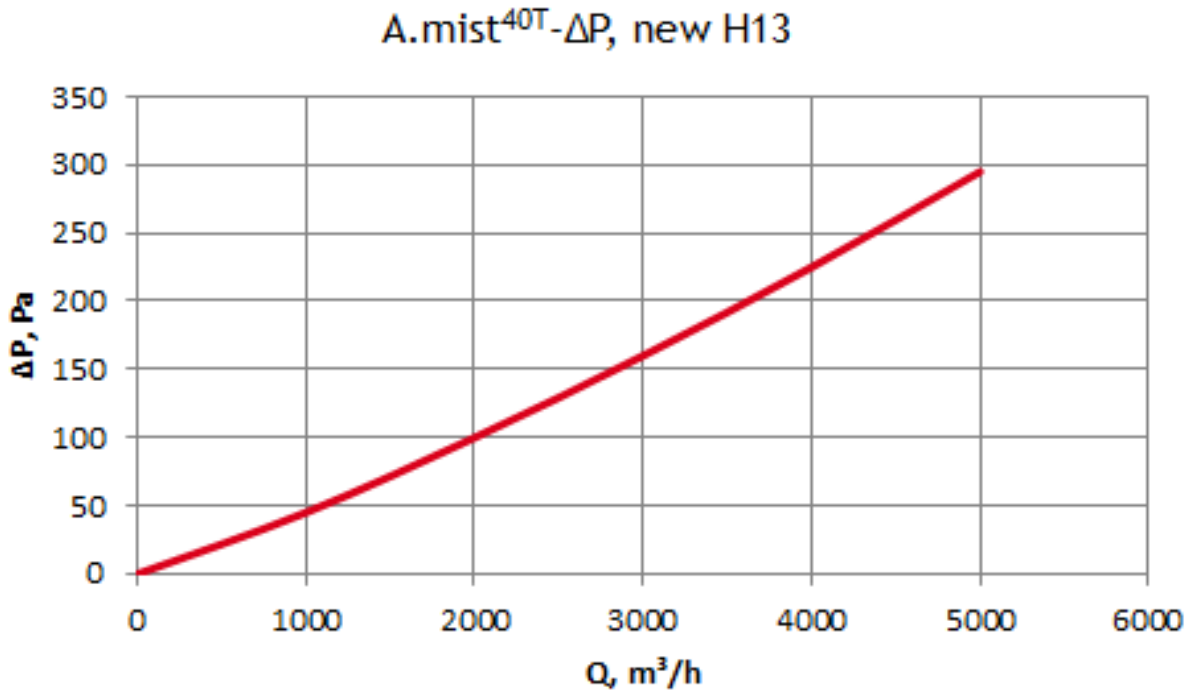
11.2.3 Airflow adjustment charts

Below you can see the airflow adjustment charts for all standard Absolent filter units with new H13-cassettes.





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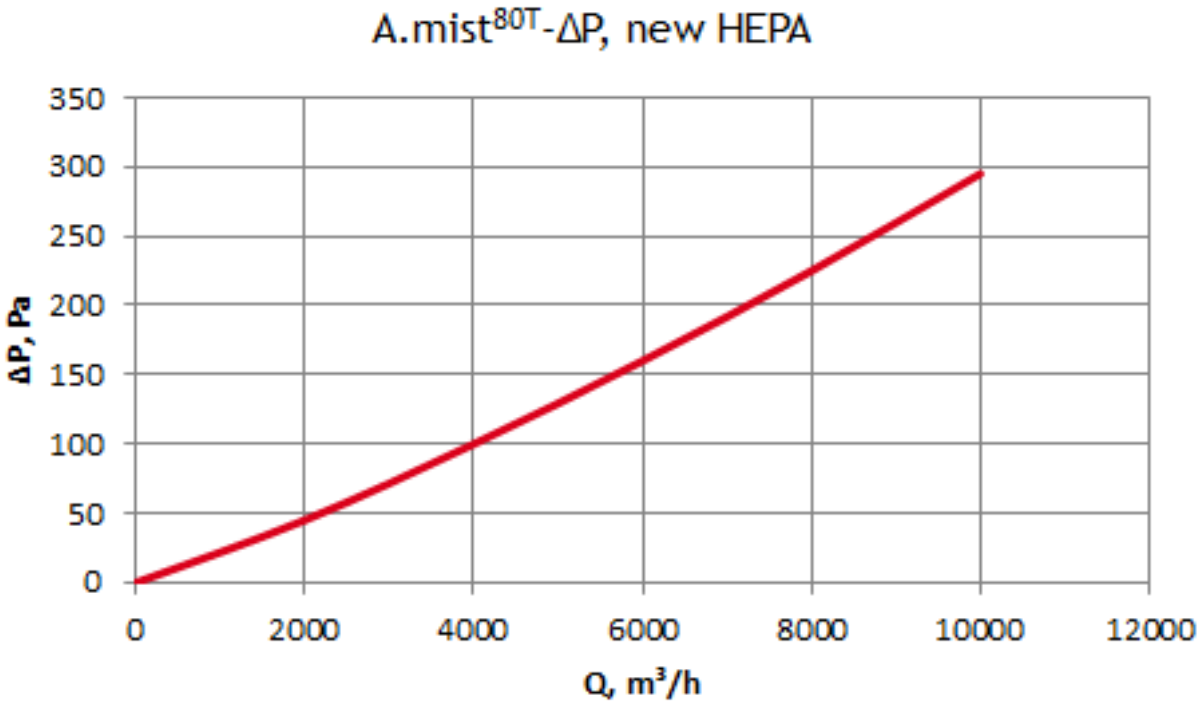

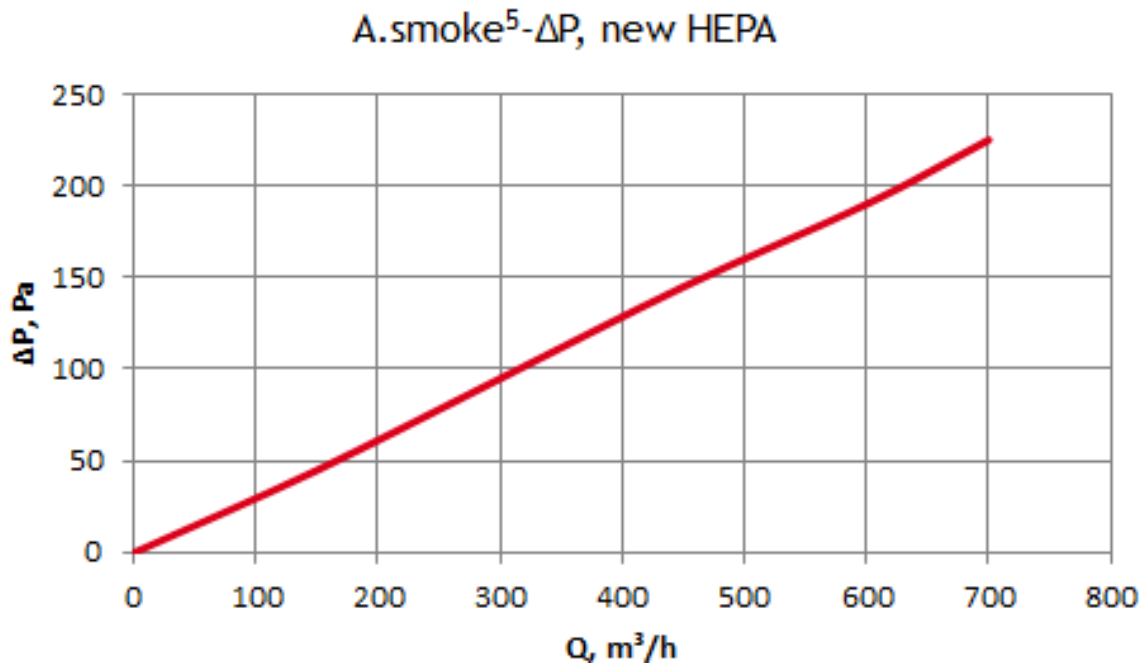

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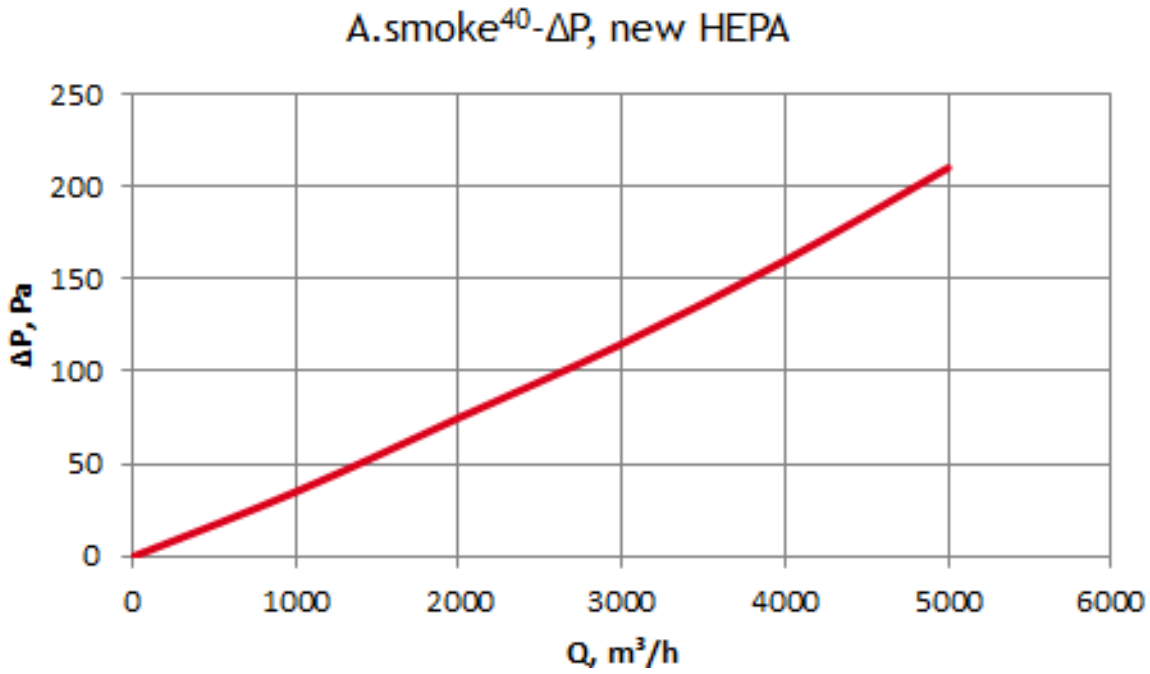

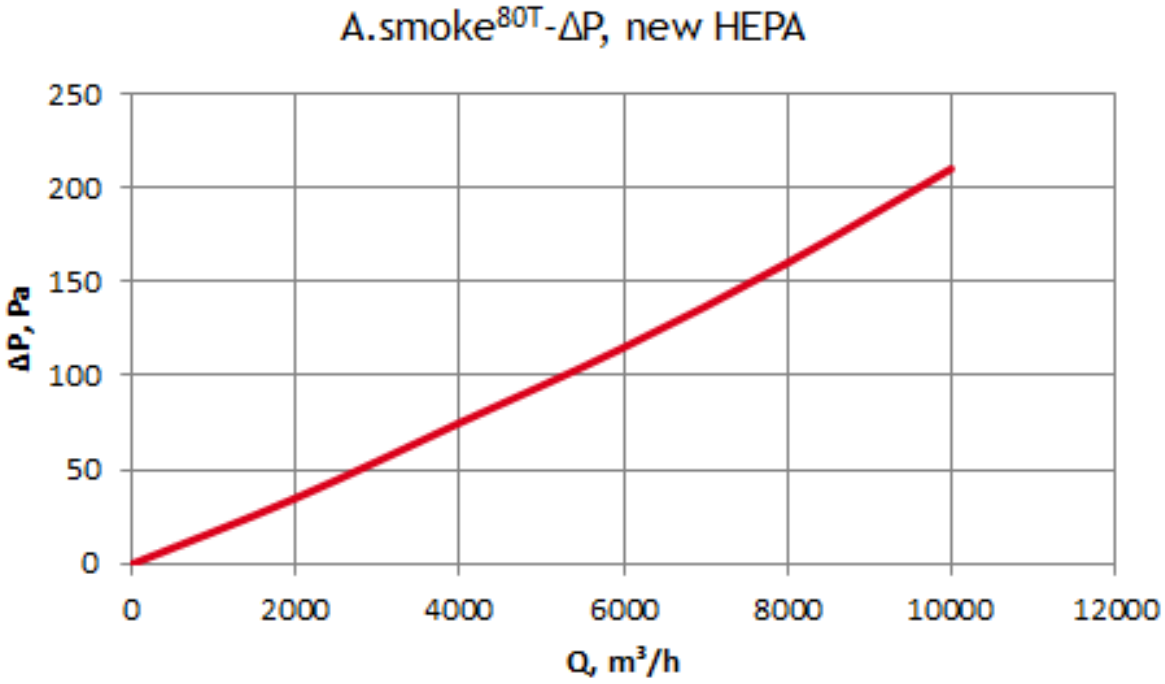

At temperatures above 40°C, it is not possible to use a flow meter for measuring the airflow. Instead, a thermometer and a pitot tube are used to calculate the airflow from each machine.

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12 Troubleshooting

12.1 Most common malfunctions

Malfunction	Possible cause	Action
Low capacity (air flow)	The fan rotates in the wrong direction.	Check the fan's direction of rotation
	With speed (rpm) regulation: The fan speed (rpm) is set too low.	Check the fan speed (rpm)
	Too high pressure drop over one or more filter cassettes.	Check the pressure drop. If the yellow or red LED lamp is lit for one of the filter stages, the cassette should be replaced.
	High pressure drop in the duct system.	Check and possibly change the duct system
	Adjustable damper is closed or incorrectly adjusted.	Check and possibly adjust the damper on the suction pipe between the machine and filter.
	The ducts are not sealed or dirty.	Check that there is no leakage from the suction pipe between the machine and filter. Check that the ducts don't contain dirt.
Abnormally short replacement interval for the HEPA filter:	An incorrectly positioned or damaged sealing strip can result in leakage past filter stages 1, 2. Resulting in un-filtered air reaching the HEPA filter.	Check that filter stages 1, 2 are fitted with the seal upward. Also check that the sealing strip is undamaged.
	Cassettes that are not secured can result in air leakage past the filter cassettes. Unfiltered air will then reached the HEPA filter.	Check that filter stages 1, 2 are secured against the sealing frame correctly.
	The filter cassette in stage 1 and/or 2 are not optimised for the application in question.	Check with Absolent that the correct filter cassette is being used in filter stage 1, 2 for the application in question.
Abnormally short service interval for the prefilter:	The filter cassette in stage 1 and/or 2 are not optimised for the application in question.	Check with Absolent that the correct field cassette is being used in filter stage 1 and/or 2 for the application in question.
	The filter cassettes have become clogged on account of high viscosity in the oil mist, which gives in-sufficient drainage.	If emulsions are used, filter clogging may be due to the filter running when production has stopped, which dries out the filter cassette (water evaporates). Consequently, switch off the filter unit when not in use. If the fluid in the process has a high viscosity, it is necessary t apply fluid with a spray system.
	The filter cassettes have become clogged.	Check that chips have not been drawn down with the air into the filter unit. The problem with chips can be solved by calibrating the air flow or coarse filtering before the filter unit. Also check that sticky particles have not clogged filter stage no. 1 (for example, in foundry applications). Contact Absolent for appropriate measures.

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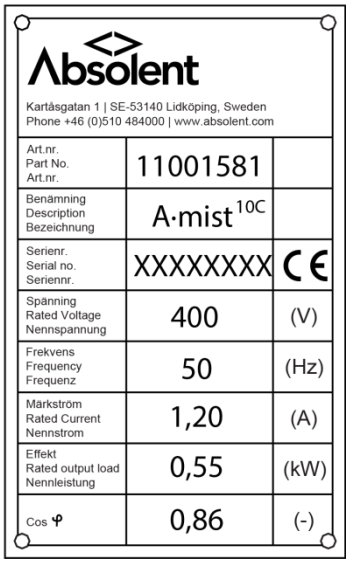
12.2 Machine plate

A machine plate is placed on the side of the filter unit.

If you have any concerns or questions, please take a look on the machine plate first and note the name and the serial number of your filter unit before contacting Absolent. Then we will be able to help you faster and easier.

In addition to the item number, name and serial number, you can also see the motor data for the current device filter.



12.3 Helpdesk - Support

Please send questions and reflections regarding the handling and/or installation of Absolent filter units to our Service Department via e-mail.

service@absolent.com

You can also contact the sales person or Absolent's distributors in order to get support and further instructions.

All contacts are followed up and you will get a response.

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13 Notes

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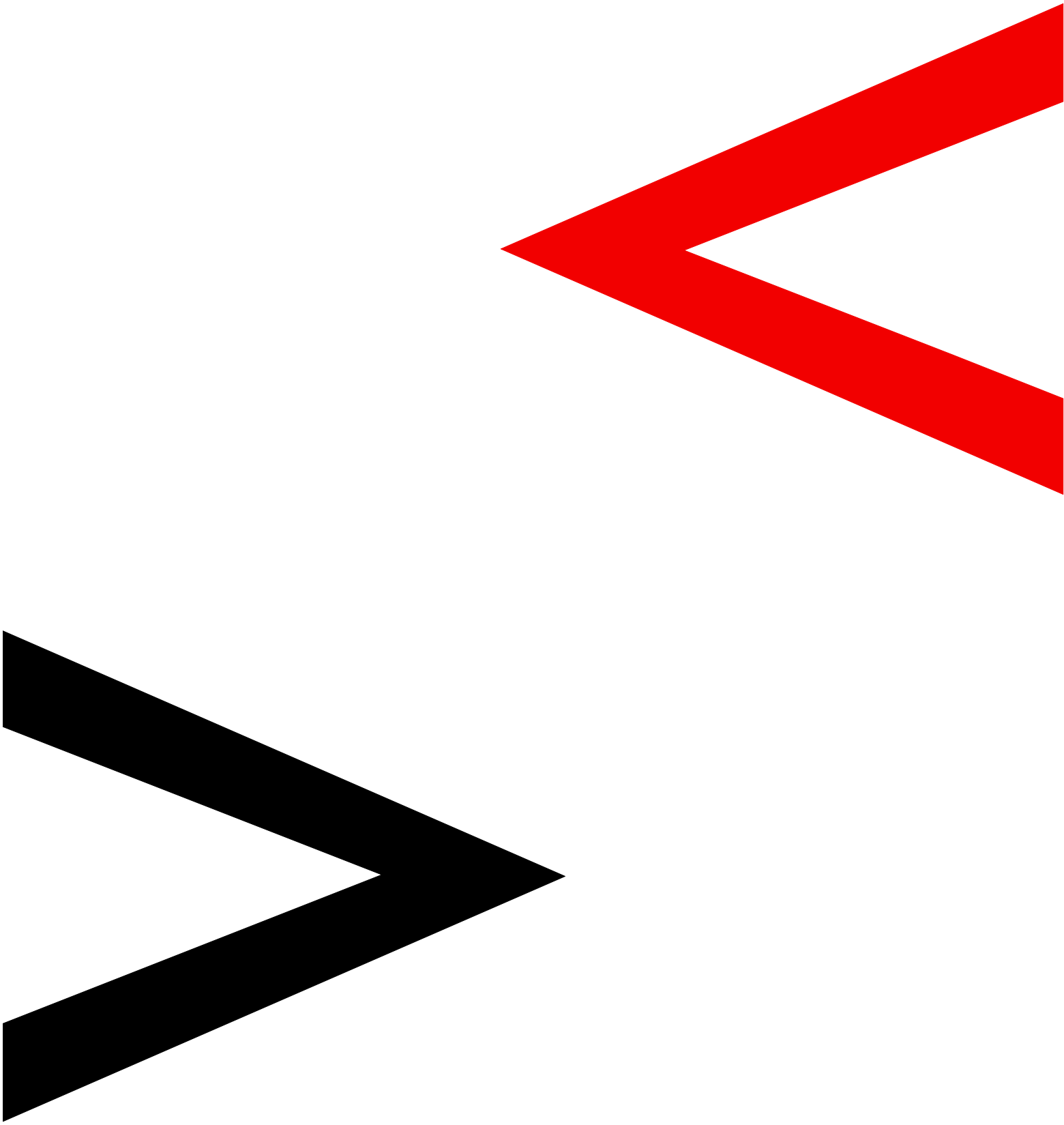

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